COUNCIL MEETING

MONDAY, MAY 27, 2013
7:00 P.M.

FOR THE REGULAR MEETING OF THE REDCLIFF TOWN COUNCIL
MONDAY, MAY 27, 2013 – 7:00 P.M.
REDCLIFF TOWN COUNCIL CHAMBERS

AGENDA ITEM		RECOMMENDATION
1.	**GENERAL**	
A)	Call to Order	
B)	Adoption of Agenda *	Adoption
C)	Accounts Payable *	For Information
D)	Bank Summary for April 30, 2013*	For Information
2.	**DELEGATION**	
A)	Formal Signing of Food Charter	
B)	Canadian Paraplegic Association (Alberta) Presentation * (Shirley Jago to be in attendance)	
3.	**MINUTES**	
A)	Council meeting held May 13, 2013 *	For Adoption
B)	Committee of the Whole meeting held May 13, 2013 *	For Information
C)	Redcliff Family and Community Support Services Board meeting held May 14, 2013 *	For Information
D)	Municipal Planning Commission meeting held May 15, 2013 *	For Information
E)	Economic Development Alliance meeting held April 13, 2013 *	For Information
4.	**BYLAWS**	
A)	Bylaw 1742/2013, being the Subdivision and Development Appeal Board Bylaw *	1st Reading
B)	Bylaw 1751/2013, being the Encroachment Permit Bylaw *	1st Reading
C)	Bylaw 1753/2013, Water Treatment Plant Borrowing Bylaw *	1st Reading
5.	**STAFF RECOMMENDATIONS**	
A)	Postage Machine Rental Agreement *	For Consideration
B)	2013 Municipal Election – Advance Vote *	For Consideration

6. POLICIES

A)	Policy 119, External Municipal Planning Documents Review Policy *	For Approval

7. CORRESPONDENCE

A)	Alberta Transportation * Re: Alberta Municipal Water/Wastewater Partnership Funding	For Information
B)	Alberta Transportation * Re: Federal Gas Tax Fund (FGTF) Grant	For Information
C)	Alberta Transportation * Re: 2012 Basic Municipal transportation Grant	For Information
D)	Wellness Alberta * Re: Invitation to join Wellness Alberta	For Discussion

8. OTHER

A)	Municipal Manager's Report to Council *	For Information
B)	Mayor and Councillor Reports *	For Information
C)	Wastewater System Evaluation *	For Information
D)	Land Sale * Re: Portion of 2nd Street SW	For Discussion/ Consideration

9. RECESS

10. IN CAMERA

A) Labour

11. ADJOURN

ACCOUNTS PAYABLE MAY 9, 2013 - MAY 16, 2013			
COUNCIL MEETING MAY 27, 2013			
72855	PROVINCIAL TREASURER - LAPP	CONTRIBUTIONS TO MAY 4, 2013	$16,798.56
72856	RECEIVER GENERAL	STATUATORY DEDUCTIONS REGULAR PAY MAY 4, 2013; MAY COUNCIL PAY	$29,676.88
72857	TOWN OF REDCLIFF	REGULAR PAY TO MAY 4, 2013; MAY COUNCIL PAY	$69,578.93
72858	ACKLANDS	SCREW EXTRACTOR SET, SAFETY VESTS, EARPLUGS, BATTERIES	$404.73
72859	ATRON REFRIGERATION	REPLACE BELT ON ARENA DRESSING ROOM HEATER	$181.65
72860	BENCHMARK ASSESSMENT	MAY - JULY ASSESSMENT FEES	$14,106.75
72861	BENCHMARK GEOMATICS	GRADE PLAN 7 RIVERVIEW COURT SE	$210.00
72862	BIG EAGLE SERVICES	LEACHATE EVACUATION LANDFILL	$1,546.13
72863	THE BOLT SUPPLY HOUSE	TAPPING SCREWS, CARRIAGE BOLTS	$33.35
72864	D & M PLASTICS	GARBAGE LIDS	$11,704.98
72865	DAVIES,MIKE	UNADDRESSED ADMAIL FOR NEWSLETTERS	$383.99
72866	FARMLAND SUPPLY	TIMER, TIPS, HOSE, CLAMPS	$308.54
72867	FOX ENERGY SYSTEMS	POCKET MASKS, BANDAGES, ADHESIVE DRESSINGS	$82.74
72868	REDCLIFF HOME HARDWARE	WET/DRY VAC LANDFILL, CLEANER, PAINT, STAPLER KIT, ETC	$977.06
72869	KAIZEN LAB	THM LAB TESTING - WTP	$103.95
72870	MNP	2012 AUDIT FEES	$8,505.00
72871	NIEDERMAYER, MARK	APRIL GUITAR INSTRUCTION FEES	$210.00
72872	PC CORP	SSL CERTIFICATES 2013-2016	$281.40
72873	PRIME PRINTING	TAX NOTICE FORMS	$108.15
72874	PUROLATOR	FREIGHT OF DOCUMENTS TO MPE ENGINEERING	$38.42
72875	SAFETY CODES	MARCH SAFETY CODES	$18.00
72876	SANATEC ENVIRONMENTAL	PUMP SEPTIC TANK LANDFILL	$136.50
72877	SHORTGRASS LIBRARY SYSTEM	2013 MEMBERSHIP LEVY	$13,020.00
72878	STEINKE, JAMES	REIMBURSE TRAVEL EXPENSES ARB TRAINING	$258.16
72879	ST. JOHN AMBULANCE	BABYSITTING COURSE INSTRUCTION FEES	$350.00
72880	TELUS COMMUNICATION	MAY CELL PHONES, PHONE, RADIO & PAGER CHARGES	$38.04
72881	TELUS MOBILITY	MAY CELL PHONES, PHONE, RADIO & PAGER CHARGES	$367.31
72882	JACOB'S WELDING	WELD QUICK ATTACH UNIT#134 LOADER	$1,039.50
72883	MADILL, APRIL	REFUND FOR CANCELLED PERSONALITY CLASS	$36.67
72884	GROVES ROOFING	REMOVE & REPLACE SHINGLES - AQUATIC CENTRE	$10,636.50
72885	TROPHY & ENGRAVING WORLD	PLAQUES FOR VOLUNTEER APPRECIATION NIGHT	$704.13
72886	WESTERN CANADA WELDING	WELDING RODS	$82.95
72887	WOLSELEY MECHANICAL	CLAMPS	$1,235.87
72888	ZEP SALES & SERVICE	CLEANING SUPPLIES	$2,506.00
72889	A & B STEEL	CONCRETE BITS	$102.90
72890	ACKLANDS	DISPOSABLE GLOVES	$31.75
72891	BIG EAGLE SERVICES	LEACHATE EVACUATION LANDFILL	$651.00
72892	THE BOLT GUYS	LOC TITE ADHESIVE, PAINT MARKERS, GLOVES, OIL, ETC	$66.28
72893	CARVER CONSTRUCTION	PRJ# 99 - RAW WATER PUMP STATION UPGRADE	$39,730.75
72894	CITY OF MEDICINE HAT	APRIL UTILITY ACCOUNTS, APRIL SEWAGE OUTLAY	$72,646.81
72895	CANADIAN PACIFIC RAILWAY	APRIL FLASHER MAINTENANCE CONTRACT	$667.24
72896	DUCKERINGS TRANSPORT	FREIGHT OF ROAD REPAIR MATERIAL	$399.88
72897	EECOL ELECTRIC	FUSES	$25.28
72898	FORTY MILE GAS CO-OP	APRIL GAS UTILITY LANDFILL	$166.35
72899	GRAND RENTAL STATION	VOLUNTEER APPRECIATION NIGHT DECORATIONS	$990.71
72900	JOHN'S WATER HAULING	WATER DELIVERY LANDFILL	$90.00
72901	LETHBRIDGE HERALD	APRIL ADVERTISING, APRIL-JUNE SUBSCRIPTIONS	$4,718.40
72902	LETHBRIDGE MOBILE SHREDDING	APRIL SHREDDING SERVICE	$66.15
72903	MEDICINE HAT CO-OP	CUTTING DISKS, CROW BAR, MARKERS	$93.48
72904	MEDICINE HAT NEWS	APRIL ADVERTISING	$1,228.50
72905	PC CORP	MARCH SYSTEM SUPPORT, SERVER HARD DRIVE EXPANSION	$1,358.44
72906	PRIME PRINTING	NEWSLETTER FOLDING	$81.90
72907	THE PRINTER	BUSINESS CARDS R.GRADWELL, S.SIMON; SWIM PASSES - POOL	$310.80
72908	PRITCHARD & COMPANY	CAVEAT DISCHARGES	$220.89
72909	ROSENAU TRANSPORT	FREIGHT OF TRAFFIC PAINT, GARBAGE LIDS, CHORINE WTP	$1,010.01
72910	SIMON, SHANON	REIMBURSE TRAVEL EXPENSES ALUP TRAINING	$644.40
72911	TELUS MOBILITY	MAY CELL PHONES, PHONE, RADIO & PAGER CHARGES	$71.86
72912	GUNTHER, HORST	REFUND CREDIT ON INACTIVE UTILITY ACCOUNT	$55.36
72913	HALF MOON YOGA STUDIO	YOGA INSTRUCTION FEES	$200.00
72914	TOWN OF REDCLIFF LANDFILL	APRIL LANDFILL TONNAGE	$4,955.28
72915	WCB	MARCH & APRIL PREMIUMS	$3,963.99
72916	WE CARE HOME HEALTH CARE	APRIL HOME CARE FEES	$224.00
72917	WOLSELEY MECHANICAL	SEWER PIPE	$328.10
72918	W.R. MEADOWS	ROAD REPAIR MATERIAL, WHITE TRAFFIC PAINT	$1,879.30
72919	XEROX CANADA	WC7655 APRIL COPIER FEES, PRO232 MARCH COPIER FEES	$188.98
	TOTAL CHEQUES: 65	AMOUNT OF CHEQUES:	$322,839.63

BANK SUMMARY FOR APRIL 30, 2013

DESCRIPTION	GENERAL	PAYROLL	TOTAL
BALANCE FORWARD	370,758.19	10,000.00	380,758.19
DAILY DEPOSITS	275,186.89	126,826.11	402,013.00
CIBC DIRECT DEPOSITS/ TELEBANKING	3,854,384.72		3,854,384.72
INTEREST EARNED	5,074.37		5,074.37
T-BILL REDEMPTIONS	0.00		0.00
OTHER DIRECT DEPOSITS	6,127.41		6,127.41
SUBTOTAL	4,140,773.39	126,826.11	4,267,599.50
CHEQUES	(760,411.53)	(126,826.11)	(887,237.64)
ASFF QUARTERLY PAYMENTS	0.00		0.00
DEBENTURE PAYMENTS	(1,307.98)		(1,307.98)
T-BILL PURCHASES	(3,200,000.00)		(3,200,000.00)
NSF CHEQUES	0.00		0.00
OTHER DIRECT WITHDRAWALS	(3,815.06)		(3,815.06)
SUBTOTAL	(3,965,534.57)	(126,826.11)	(4,092,360.68)
TOTAL	**545,997.01**	**10,000.00**	**555,997.01**
BANK CLOSING BALANCE	578,360.55	10,000.00	588,360.55
ADD:O/S DEPOSITS	2,836.00		2,836.00
LESS:O/S CHEQUES	(35,199.54)		(35,199.54)
TOTAL	**545,997.01**	**10,000.00**	**555,997.01**

INVESTMENTS

CIBC PREMIUM T-BILL FUND	5.12.02.321	11,400,000.00
CCU SHORT TERM INVEST/LANDFILL	5.12.02.126	1,493,690.36
TOTAL INVESTMENTS		12,893,690.36

TOWN OF REDCLIFF
MAY 22 2013
FINANCE DEPT.

Canadian Paraplegic Association (Alberta)

Mission Statement

"To assist persons with spinal cord injuries and other physical disabilities to achieve independence, self-reliance and full community participation."

Universal Design

is the design of product and environments
to be usable by all people, to the greatest extent possible,
without the need of adaptation or specialized design.

The Principles of Universal Design are:

- Equitable Use
- Flexibility in Use
- Simple and Intuitive Use
- Perceptible Information
- Tolerance of Error
- Low Physical Effort
- Size and Space for Approach and Use

Bathrooms

I am welcome

"Flip up grab bars on both sides of commode for safe transfers. Easy access to…"

I am not welcome

"Toilet is too low for safe transfers. High grab bars. Minimal room for…"

Counters

I am welcome

I am not welcome

The knee space beneath a barrier-free counter intended to be used as a work surface shall not be less than…a) 760 mm wide b) 685 mm high c) 484 mm deep.

MINUTES OF THE REGULAR MEETING OF THE REDCLIFF TOWN COUNCIL
MONDAY, MAY 13, 2013 – 7:00 P.M.

PRESENT:	Mayor	R. Hazelaar
	Councillors	C. Brown, C. Crozier, D. Kilpatrick, E. Reimer, E. Solberg, J. Steinke
	Municipal Manager	D. Wolanski (left at 818 p.m.; re-joined @ 10:02 p.m.)
	Director of Finance & Administration	R. Osmond (left at 8:18 p.m.)
	Manager of Legislative and Land Services	S. Simon (left at 8:18 p.m.)

1. GENERAL

Call to Order

A) Mayor Hazelaar called the regular meeting to order at 7:00 p.m.

Adoption of Agenda

B) Councillor Reimer moved the Agenda be adopted as presented. – Carried Unanimously.

Accounts Payable

C) Councillor Crozier moved the following 73 general vouchers in the amount of $250,491.59 be received for information. – Carried Unanimously.

ACCOUNTS PAYABLE APRIL 22, 2013 - MAY 6, 2013			
COUNCIL MEETING MAY 13, 2013			
72782	AMRON CONSTRUCTION	REFUND CONSTRUCTION DAMAGE DEPOSITS	$3,000.00
72783	ATRON REFRIGERATION	CALCIUM CHLORIDE, ARENA SHUT DOWN	$372.75
72784	CENTRAL SHARPENING	SHARPEN BLADE UNIT # 101 ZAMBONI	$157.50
72785	FARMLAND SUPPLY CENTER	STRAINER	$30.77
72786	FEATURE FINISHING	REFUND CONSTRUCTION DAMAGE DEPOSITS	$2,500.00
72787	GARLAND, JAMIE	CONDOLENCE GIFT CARD S.KUSTRA	$79.15
72788	GREYHOUND COURIER	FREIGHT OF PARTS UNIT #123 LOADER	$22.26
72789	GVN STRUCTURES INC.	REFUND CONSTRUCTION DAMAGE DEPOSITS	$2,000.00
72790	MH WHOLESALE FOODS	MEALS ON WHEELS CONTAINERS & LIDS	$95.72
72791	SHAW CABLE	MAY INTERNET SERVICES	$375.54
72792	PITNEY BOWES	REFILL POSTAGE MACHINE	$2,100.00
72793	PUROLATOR	FREIGHT OF WATER TREATMENT SAMPLES	$31.99
72794	BLATZ HOMES	REFUND CONSTRUCTION DAMAGE DEPOSIT	$500.00
72795	BEYAK, TYSON	REFUND UTILITY CREDIT ON ACCOUNT	$26.21
72796	BATIUK, LOGAN	REFUND UTILITY CREDIT ON ACCOUNT	$568.68
72797	VICKERS HENDRIX	REFUND DUPLICATE PAYMENT	$34.00
72798	XROAD HOMES	REFUND CONSTRUCTION DAMAGE DEPOSIT	$500.00
72799	CIBC	SUPPLEMENTAL PENSION TO APRIL 20, 2013	$5,172.35
72800	C.U.P.E.	UNION DUES TO APRIL 20, 2013	$1,722.35
72801	MPE ENGINEERING	PRJ#21 WTP, PRJ#99 WATER PUMP, PRJ#100 WATER SUPPLY	$34,658.93
72802	PROVINCIAL TREASURER - LAPP	LAPP CONTRIBUTIONS TO APRIL 20, 2013	$30,770.17
72803	RECEIVER GENERAL	STATUATORY DEDUCTIONS TO APRIL 20, 2013	$26,714.34
72804	TELUS	APRIL CELL PHONES, PHONE, RADIO & PAGER CHARGES	$120.94
72805	TELUS MOBILITY	APRIL CELL PHONES, PHONE, RADIO & PAGER CHARGES	$109.73
72806	TOWN OF REDCLIFF	EMPLOYEE PROPERTY TAX PAYMENTS TO APRIL 20, 2013	$1,061.50
72807	TOWN OF REDCLIFF	REGULAR PAY TO APRIL 20, 2013	$57,818.60
72808	AMSC INSURANCE SERVICES	MAY EMPLOYEE HEALTH BENEFITS, MARCH HEALTH SPENDING	$14,623.06

72809	AMSC INSURANCE SERVICES	ADDITIONS & DELETIONS TO VEHICLE INSURANCE POLICY	$432.47
72810	BENCHMARK GEOMATICS	GRADING PLAN 327 REDCLIFF WAY SW, 48 RIVERVIEW DR. SE	$315.00
72811	BOSS LUBRICANTS	ENGINE OIL, GREASE	$2,241.02
72812	COMMUNITY FOOD CONNECTION	REIMBURSEMENT OF WATER COSTS FOR COMMUNITY GARDEN	$344.67
72813	COSTCO WHOLESALE	COFFEE, HOT CHOCOLATE, COFFEE CUPS, PAPER	$203.56
72814	CRANSTON, CAROL	REIMBURSE FOR COW SUPPER SUPPLIES APRIL 22, 2013	$69.63
72815	FORT GARRY FIRE TRUCKS	LIGHT STRIP AND LIGHTHEAD UNIT#120 PUMPER TRUCK	$2,120.90
72816	HYDRACO INDUSTRIES	HYDRAULIC LIFT CYLINDER, ETC UNIT#119 INTERNATIONAL	$2,485.53
72817	PAD-CAR MECHANICAL	HVAC MAINTENANCE RCMP	$1,538.90
72818	REDCLIFF BAKERY	MPC LUNCH APRIL 17, 2013	$68.25
72819	WITTEVRONGEL RANCHING	REFUND BULK WATER SIGN ON FEES AND DEPOSIT	$105.25
72820	GRAY, CHARLES	REFUND UTILITY SIGN ON FEES AND DEPOSIT	$115.75
72821	TOWN OF REDCLIFF	ENGRAVER, COMMUNITY GARDEN MEETING REFRESHMENTS, ETC	$202.00
72822	TOWN OF REDCLIFF	MEALS FOR OVERTIME CREW - WATER LEAK, REFUND TEST FEE, ETC	$160.19
72823	GENIVAR CONSULTANTS	PRJ#108 TOBOGGAN HILL EROSION PROTECTION	$2,403.98
72824	A & B STEEL	CLEVIS, GROUNDING CLAMP, SWIVEL CASTORS	$171.73
72825	ACKLANDS - GRAINGER	WELDING GLOVES, DISPOSABLE GREASE GLOVES	$26.21
72826	ADOA	2013 MEMBERSHIP FEE - B.STEHR	$100.00
72827	AFFINITY WELDING	REPAIRS TO DOOR AND FRAME UNIT#128 GARBAGE TRUCK	$931.32
72828	ALTA-WIDE BUILDERS SUPPLIES	CEMENT, GROUT	$254.89
72829	AMTCO	2013 MEMBERSHIP FEE - T.PRICE	$220.35
72830	C.E.M. HEAVY EQUIPMENT	FAN AND AC BELTS, SUPPORTS, PULLEY, ETC UNIT#134 LOADER	$780.01
72831	CIBC VISA	GFOA CONFERENCE, MEMBERSHIP FEES, REPEATER LICENSE, ETC	$4,861.15
72832	CORIX WATER	WATER METERS, PRJ#40 EASTSIDE PHASE 1 - LANDSCAPING & PARKS	$4,514.43
72833	DAN JANE VENTURES	PROPANE	$51.94
72834	EPCOR ENERGY	APRIL ELECTRIC UTILITY LANDFILL	$188.76
72835	FINNING	FILTERS UNIT#142 COMPACTOR, COLD WEATHER OIL	$521.03
72836	FOUNTAIN TIRE	FLAT TIRE REPAIR UNIT#94 GARBAGE TRUCK	$53.88
72837	FOX ENERGY	MECHANICS & PVC GLOVES, SAFETY GLASSES, PPE COVERALLS	$438.33
72838	GAS CITY HYDRO VAC	HYDROVAC LINES AT LIONS PARK, CURB STOP	$708.75
72839	HARV'S JANITORIAL SERVICES	APRIL JANITORIAL SERVICES	$3,386.25
72840	KIRK'S MIDWAY TIRE	FLAT TIRE REPAIR UNIT# 139 JOHN DEERE	$27.30
72841	MH CO-OP	FENCE GATE CLOSURE, GRASS SEED, UTILITY KNIFE, GLOVES	$155.27
72842	NAPA AUTO PARTS	DIAL INDICATOR AND BASE, TRUCK BRAKE SPRING PLYER	$218.82
72843	PALLISER ECONOMIC PARTNERSHIP	2013 MEMBERSHIP CONTRIBUTIONS	$5,588.00
72844	SUNCOR	DYED DIESEL - LANDFILL, CLEAR & DYED DIESEL & FUEL - PS	$18,497.38
72845	PINNACLE INTERNATIONAL	ABSORBERS, BRAKES, BEARINGS, ETC UNIT#128 GARBAGE TRUCK	$2,200.47
72846	PITNEY WORKS	MAY FOLDER STUFFER CONTRACT, INK FOR POSTAGE MACHINE	$691.56
72847	PRITCHARD & COMPANY	CAVEAT DISCHARGE FEES	$150.76
72848	PUROLATOR	FREIGHT OF WATER TREATMENT SAMPLES	$28.82
72849	RODEO FORD	POWER STEERING HOSE AND TUBES UNIT#103 ECONOLINE	$177.53
72850	SAFEGUARD	CHEQUES	$170.29
72851	SCHEFFER ANDREW	MARCH PLANNING SERVICES	$648.38
72852	TELUS	MAY CELL PHONES, PHONE, RADIO & PAGER CHARGES	$1,709.65
72853	MIKES ROADHOUSE	VOLUNTEER BANQUET CATERING, APRIL MEALS ON WHEELS	$4,744.69
72854	TOWN OF REDCLIFF	POOL FLOAT & PETTY CASH	$300.00
	TOTAL CHEQUES: 73	AMOUNT OF CHEQUES:	$250,491.59

Bank Summary for March 31, 2013

D) Councillor Steinke moved the Bank Summary for March 31, 2013 be received for information. – Carried Unanimously.

2. DELEGATION

Community Food Connections Food Charter Presentation

A) Marcia Stodalka, Ann Pudwell, and Les Pearson were in attendance to make a presentation to Council regarding the Community Food Connections Food Charter.

Councillor Steinke moved the presentation regarding Community Food Connections Food Charter be received for information. – Carried Unanimously.

Councillor Steinke moved to adopt the Community Food Connections Food Charter as presented and recommended by Redcliff Family and Community Support Services Board. Further that the Mayor be authorized to sign the Community Food Connections Food Charter. – Carried Unanimously.

Marcia Stodalka, Ann Pudwell, and Les Pearson (left at 7:22 p.m.)

3. MINUTES

Council meeting held April 22, 2013

A) Councillor Crozier moved the minutes of the Council meeting held April 22, 2013 be adopted as presented. – Carried Unanimously.

Committee of the Whole meeting held April 22, 2013

B) Councillor Solberg moved the minutes of the Committee of the Whole meeting held April 22, 2013 be received for information. – Carried Unanimously.

Redcliff and District Recreation Services Board meeting held May 6, 2013

C) Councillor Crozier moved the minutes of the Redcliff and District Recreation Services Board meeting held May 6, 2013 be received for information. – Carried Unanimously.

Temporary Road Closure for Redcliff Days

i) Councillor Crozier moved that temporary road closures during Redcliff Days of

- Sissons Drive SE from Broadway Avenue to Mitchell Street SE from Noon on Saturday June 15, 2013 to 2:00 a.m. on Sunday, June 16, 2013;
- 3 Street SE from Broadway Avenue to 3rd Avenue SE and 1st Avenue SE from 2nd Street SE to 4th Street SE for the Third Street Bazaar, Parkside School and Legion Memorial Park activities from 6:00 a.m. to 6:00 p.m.; and
- 2nd Avenue from Main Street S to 1 Street SW for activities in the area of the Rec-Tangle parking lot and on the 200 block of Main Street S from

6:00 a.m. to 6:00 p.m.
be approved as presented. Further that all emergency services be advised of the temporary road closures. – Carried Unanimously.

Ice Schedule (2013-2014)

ii) Councillor Crozier moved the 2013 – 2014 Ice Schedule as follows:

Public Skating	Monday - Friday	9:30 a.m. – 10:30 a.m.
	Tuesday & Thursday	6:30 p.m. – 7:30 p.m.
	Saturday	5:45 p.m. – 6:45 p.m.
	Sunday	5:30 p.m. – 6:30 p.m.
Goodyear	Sunday	4:15 p.m. – 5:15 p.m.
Redcliff Skating Club	Monday to Thursday	3:30 p.m. – 6:15 p.m.
	Friday	4:00 p.m. – 6:15 p.m.
Redcliff Minor Hockey	Monday & Friday	6:30 p.m. – 10:00 p.m.
	Tuesday & Thursday	7:45 p.m. – 10:00 p.m.
	Wednesday	6:30 p.m. – 8:45 p.m.
	Saturday	8:00 a.m. – 4:15 p.m.
	Saturday	7:00 p.m. – 10:00 p.m.
	Sunday	9:00 a.m. – 4:00 p.m.
Medicine Hat Men's League	Wednesday	9:00 p.m. – 10:00 p.m.
Cancarb	Friday	2:30 p.m. – 3:45 p.m.
Spitfires	Friday	10:15 p.m. – 11:30 p.m.
Reimer	Saturday	4:30 p.m. – 5:30 p.m.
Redcliff Angels	Sunday	6:45 p.m. – 8:00 p.m.
Iron Horse Energy (formerly Haliburton)	Sunday	8:15 pm – 9:30 pm
Special Events		
Redcliff Minor Hockey Tournaments:	Midget	November 29 – 31, 2013
	Bantam	December 6 - 8, 2013
	Pee Wee	January 10 -12, 2014
	Atom	January 24 - 26, 2014
	Novice	February 7 - 9, 2014
	Timbits Mighty Mites	February 21 - 23, 2014
Redcliff Skating Club	Carnival	March 23, 2014 10:00 a.m. – 5:00 p.m.

be approved as submitted. - Carried Unanimously.

Palliser Economic Partnership meeting February 8, 2013

D) Councillor Solberg moved the minutes of the Palliser Economic Partnership meeting held February 8, 2013 be received for information. – Carried Unanimously.

Palliser Economic Partnership meeting April 26, 2013

E) Councillor Solberg moved the minutes of the Palliser Economic Partnership meeting held April 26, 2013 be received for information. – Carried Unanimously.

Canadian Badlands meeting March 6, 2013

F) Councillor Reimer moved the minutes of the Canadian Badlands meeting held March 6, 2013 be received for information. Carried Unanimously.

Shortgrass Library System meeting February 20, 2013

G) Councillor Kilpatrick moved the minutes of the Shortgrass Library System meeting held February 20, 2013 be received for information. – Carried Unanimously.

Redcliff Public Library Board meeting March 26, 2013

H) Councillor Steinke moved the minutes of the Redcliff Public Library Board meeting held March 26, 2013 be received for information. – Carried Unanimously.

4. BYLAWS

Bylaw 1743/2013 being a Bylaw to amend Bylaw No. 1160/98, being the Northwest Horticulture Storm Sewer Project Bylaw and Bylaw 1175/98 being a Bylaw to amend Bylaw 1160/98

A) Councillor Crozier moved Bylaw 1743/2013 being a Bylaw to amend Bylaw No. 1160/98, being the Northwest Horticulture Storm Sewer Project Bylaw and Bylaw 1175/98 being a Bylaw to amend Bylaw 1160/98 be given second reading. – Carried Unanimously.

Councillor Solberg moved Bylaw 1743/2013 being a Bylaw to amend Bylaw No. 1160/98, being the Northwest Horticulture Storm Sewer Project Bylaw and Bylaw 1175/98 being a Bylaw to amend Bylaw 1160/98 be given third reading. – Carried Unanimously.

Bylaw 1744/2013 being a Bylaw to amend Bylaw No. 1454/2006, being the Broadway Avenue East (Main Street to Sissons Drive SE) Road Project Bylaw

B) Councillor Kilpatrick moved Bylaw 1744/2013 being a Bylaw to amend Bylaw No. 1454/2006, being the Broadway Avenue East (Main Street to Sissons Drive SE) Road Project Bylaw be given second reading. – Carried Unanimously.

Councillor Steinke moved Bylaw 1744/2013 being a Bylaw to amend Bylaw No. 1454/2006, being the Broadway Avenue East (Main Street to Sissons Drive SE) Road Project Bylaw be given third reading. – Carried Unanimously.

Bylaw 1745/2013 to amend Bylaw No. 1128/97, being the 700 and 800 Blocks of 2nd Street S.E. Paving Project Bylaw and to amend Bylaw 1173/98 to amend Bylaw 1128/97 and Bylaw 1180/98 to amend Bylaw 1128/97

C) Councillor Reimer moved Bylaw 1745/2013 to amend Bylaw No. 1128/97, being the 700 and 800 Blocks of 2nd Street S.E. Paving Project Bylaw and to amend Bylaw 1173/98 to amend Bylaw 1128/97 and Bylaw 1180/98 to amend Bylaw 1128/97 be given second reading. - Carried Unanimously.

Councillor Solberg moved Bylaw 1745/2013 to amend Bylaw No. 1128/97, being the 700 and 800 Blocks of 2nd Street S.E. Paving Project Bylaw and to amend Bylaw 1173/98 to amend Bylaw 1128/97 and Bylaw 1180/98 to amend Bylaw 1128/97 be given third reading. - Carried Unanimously.

Bylaw 1746/2013 being a Bylaw to amend Bylaw 1309/2002, being the South Railway Street NE Storm Sewer project Bylaw and Bylaw 1355/2003 being a Bylaw to amend Bylaw 1309/2002

D) Councillor Kilpatrick moved Bylaw 1746/2013 being a Bylaw to amend Bylaw 1309/2002, being the South Railway Street NE Storm Sewer project Bylaw and Bylaw 1355/2003 being a Bylaw to amend Bylaw 1309/2002 be given second reading. Carried Unanimously.

Councillor Brown moved Bylaw 1746/2013 being a Bylaw to amend Bylaw 1309/2002, being the South Railway Street NE Storm Sewer project Bylaw and Bylaw 1355/2003 being a Bylaw to amend Bylaw 1309/2002 be given third reading. Carried Unanimously.

Bylaw 1747/2013 to amend Bylaw No. 1686/2011, being the Mitchell Street SE (1st Avenue to 4th Avenue), Birch Court, Elm Court and Willow Court Road Rehabilitation Project – Local Improvement Tax Bylaw

E) Councillor Steinke moved Bylaw 1747/2013 to amend Bylaw No. 1686/2011, being the Mitchell Street SE (1st Avenue to 4th Avenue), Birch Court, Elm Court and Willow Court Road Rehabilitation Project – Local Improvement Tax Bylaw be given second reading. – Carried Unanimously.

Councillor Crozier moved Bylaw 1747/2013 to amend Bylaw No. 1686/2011, being the Mitchell Street SE (1st Avenue to 4th Avenue), Birch Court, Elm Court and Willow Court Road Rehabilitation Project – Local Improvement Tax Bylaw be given third reading. – Carried Unanimously.

Bylaw 1748/2013 Town of Redcliff Community Organization Property Tax Exemption Regulation (C.O.P.T.E.R.) Bylaw

F) Councillor Steinke moved Bylaw 1748/2013 Town of Redcliff Community Organization Property Tax Exemption Regulation (C.O.P.T.E.R.) Bylaw be given second reading. – Carried Unanimously.

Councillor Reimer moved Bylaw 1748/2013 Town of Redcliff Community Organization Property Tax Exemption Regulation (C.O.P.T.E.R.) Bylaw be given third reading. – Carried Unanimously.

Bylaw 1749/2013 Tax Rate Bylaw

G) Councillor Brown moved Bylaw 1749/2013 Tax Rate Bylaw be given second reading. – Carried Unanimously.

Councillor Solberg moved Bylaw 1749/2013 Tax Rate Bylaw be given third reading. – Carried.

5. STAFF RECOMMENDATIONS

Community Organization Property Tax Exemption (COPTER)

A) Councillor Crozier moved that the Town of Redcliff exempt the following properties from property taxation in accordance with the Community Organization Property Tax Exemption Regulations for the 2013 taxation year

i) German Canadian Harmony Club
ii) Redcliff Community Curling Club
iii) Riverview Golf Club.

- Carried Unanimously.

Debit Machine at Aquatic Centre

B) Councillor Solberg moved that the Town of Redcliff add a debit payment terminal and DSL connectivity at the Redcliff Aquatic Centre for the 2013 season at an estimated cost of $530.00 further that these expenses be funded from operations. – Carried.

6. POLICIES

Policy 042, Computer Purchase Plan

A) Councillor Kilpatrick moved that Policy 042 Computer Purchase Plan be cancelled. Further, that administration request those currently on the plan to pay in full as quickly as possible; however, those unable to pay prior to the originally agreed upon end date may be allowed to continue the original payment schedule. – Carried.

7. CORRESPONDENCE

Canadian Army Veterans Motorcycle Units
Re: Highway of Heroes

A) Councillor Steinke moved correspondence dated April 26, 2013 from Canadian Army Veterans Motorcycle Units regarding a proposal to have a section of Alberta's Trans-Canada Highway rededicated as "Highway of Heroes" be received for information. Further that administration investigates the municipality's ability to make such a declaration with the Province as well as discuss the idea with municipal neighbours. – Carried Unanimously.

Larry Kohls
Re: After Hours Emergency Line

B) Councillor Crozier moved correspondence dated April 28, 2013 from Larry Kohls regarding after hours emergency line be received for information. – Carried Unanimously.

Holiday RV Super Centre
Re: Request for use of land Lot 11, Block 1, Plan 0411924 (2500 South Highway Drive S.E.)

C) Councillor Crozier moved correspondence dated May 8, 2013 from Holiday R.V. Super Centre regarding the temporary use of Lot 11, Block 1, Plan 0411924 (2500 South Highway Drive S.E.) from May 20 – 28, 2013 for the purpose of parking of recreation vehicles be received for information. Further that Holiday RV Super Centre be allowed to store recreational vehicles from May 20 –

28, 2013 on Lot 11, Block 1, Plan 0411924 (2500 South Highway Drive SE) conditional to the site being returned to its original condition and payment of a refundable $500.00 damage deposit to the Town. - Carried Unanimously.

Alberta Tourism, Parks and Recreation Re: 2013 Energize Workshop

D) Councillor Brown moved correspondence dated April 23, 2013 from Alberta Tourism, Parks and Recreation regarding 2013 Energize Workshop be received for information. Further that the information be referred to the Redcliff and District Recreation Services Board. – Carried Unanimously.

8. OTHER

City of Medicine Hat Land Use Bylaw Concerns Matrix

A) Councillor Kilpatrick moved that the City of Medicine Hat Land Use Bylaw Concerns Matrix from the City of Medicine Hat Municipal Planning Commission Public Hearing held on April 24, 2013 be received for information. – Carried Unanimously.

Redcliff/Cypress Regional Landfill Graphs to April 30, 2013

B) Councillor Reimer moved Redcliff/Cypress Regional Landfill Graphs to April 30, 2013 be received for information. – Carried Unanimously.

9. RECESS

Mayor Hazelaar called a recess at 8:03 p.m.

Mayor Hazelaar reconvened the meeting at 8:13 p.m.

10. IN CAMERA

In Camera

Councillor Crozier moved to meet In Camera to discuss Legal and Labour matters, including the annual Municipal Manager Performance Review at 8:13 p.m. – Carried.

S. Simon, R. Osmond, and D. Wolanski left at 8:18 p.m.

D. Wolanski returned at 10:02 p.m.

Return to Open Session

Councillor Reimer moved to return to open session at 10:02 p.m. – Carried Unanimously.

RCMP Building Occupancy Agreement

Councillor Crozier moved to authorize the Mayor and Municipal Manager to sign the RCMP Building Occupancy Agreement for a ten year term effective from January 1, 2011 to December 31, 2021. – Carried Unanimously.

11. ADJOURNMENT

Adjournment

Councillor Kilpatrick moved to adjourn the meeting at 10:03 p.m. – Carried Unanimously.

Mayor

Manager of Legislative and Land Services

BANK SUMMARY FOR MARCH 31, 2013

DESCRIPTION	GENERAL	PAYROLL	TOTAL
BALANCE FORWARD	(599,873.13)	65,647.56	(534,225.57)
DAILY DEPOSITS	423,474.97	119,152.23	542,627.20
CIBC DIRECT DEPOSITS/ TELEBANKING	238,649.28		238,649.28
INTEREST EARNED	5,580.58		5,580.58
T-BILL REDEMPTIONS	1,900,000.00		1,900,000.00
OTHER DIRECT DEPOSITS	5,734.79		5,734.79
SUBTOTAL	2,573,439.62	119,152.23	2,692,591.85
CHEQUES	(1,119,888.99)	(174,799.79)	(1,294,688.78)
ASFF QUARTERLY PAYMENTS	(452,741.33)		(452,741.33)
DEBENTURE PAYMENTS	(24,110.88)		(24,110.88)
T-BILL PURCHASES	0.00		0.00
NSF CHEQUES	0.00		0.00
OTHER DIRECT WITHDRAWALS	(6,067.10)		(6,067.10)
SUBTOTAL	(1,602,808.30)	(174,799.79)	(1,777,608.09)
TOTAL	**370,758.19**	**10,000.00**	**380,758.19**
BANK CLOSING BALANCE	793,268.16	10,000.00	803,268.16
ADD:O/S DEPOSITS	23,884.66		23,884.66
LESS:O/S CHEQUES	(446,394.63)		(446,394.63)
TOTAL	**370,758.19**	**10,000.00**	**380,758.19**

INVESTMENTS

CIBC PREMIUM T-BILL FUND	5.12.02.321	8,200,000.00
CCU SHORT TERM INVEST/LANDFILL	5.12.02.126	1,492,456.18
TOTAL INVESTMENTS		9,692,456.18

TOWN OF REDCLIFF
APR 19 2013
FINANCE DEPT.

MINUTES OF THE COMMITTEE OF THE WHOLE
MONDAY MAY 13, 2013, 5:30 P.M.
TOWN COUNCIL CHAMBERS

PRESENT:	Mayor:	R. Hazelaar
	Councillors:	C. Brown, C. Crozier, D. Kilpatrick, E. Reimer, J. Steinke, E. Solberg (arrived at 5:34 p.m.)
	Municipal Manager	D. Wolanski
	Manager of Legislative and Land Services	S. Simon
	Director of Finance & Administration	R. Osmond
	Public Services Director	D. Schaffer
	Manager of Engineering	K. Minhas

1. GENERAL

A) CALL TO ORDER

Mayor Hazelaar called the meeting to order at 5:31p.m.

B) ADOPTION OF AGENDA

Councillor Reimer moved the Agenda be adopted as presented. – Carried Unanimously.

2. MINUTES

Councillor Reimer moved the minutes of the Committee of the Whole meeting held April 22, 2013 be adopted as presented. – Carried Unanimously.

3. NEW BUSINESS

A) Broadway Avenue E. Road Rehab Project

Councillor Kilpatrick moved that the Town of Redcliff install new paved apron entrances of similar width in place of existing gravel accesses up to 6m from the edge of the road within Road ROW and fund as budgeted in annual 2013 Capital Budget, in addition to road rehabilitation on Broadway Avenue E (Trans-Canada Highway – Boundary Road). – Defeated.

Councillor Kilpatrick moved that the Town of Redcliff leave the existing gravel entrances to businesses as is and carry out the road rehabilitation work on Broadway Avenue E (Trans-Canada Highway – Boundary Road). Further that the Town approach respective property owners with gravel accesses, and inquire about their interest in installing a paved apron access at the same time Broadway Avenue E will be paved. Further that whoever wants to install a paved access can arrange this work directly with the contractor. – Carried Unanimously.

With regard to the Broadway Avenue E (Trans-Canada) Highway – Boundary Road Rehab project, K. Minhas expressed concern with several properties that have gravel accesses onto Broadway Avenue and resulting damage that may occur to the new pavement. He proposed three options for consideration.

1. Leave the existing gravel entrances to businesses as is and carry out the road rehabilitation work on Broadway Ave E. (TCH – Boundary Road). Approach the respective property owners with gravel accesses, and inquire about their interest in installing a paved apron access at the same time Broadway Avenue E. will be paved. Further that whoever from the property owners wants to install a paved access can arrange this work directly with the contractor.

2. Install new paved apron entrances of similar width in place of existing gravel accesses up to 6m from the edge of the road within the Road ROW and fund as budgeted in annual 2013 capital budget, in addition to road rehabilitation on Broadway Ave E (TCH – Boundary Road).

3. Install new paved apron entrances of similar width in place of existing gravel accesses up to property line and fund this part as budgeted in annual 2013 capital budget, in addition to road rehabilitation on Broadway Avenue (TCH – Boundary Road).

Committee discussed the options and a motion was carried.

B) Transportation Master Plan
Re: Establish Review Date
Mayor Hazelaar called a Special Council Meeting to be held on May 22, 2013 at 7:00 pm to discuss the Transportation Master Plan.

C) Bylaw 1742/2013, Subdivision and Development Appeal Board Bylaw
Councillor Kilpatrick moved that proposed Bylaw 1742/2013 being the Subdivision Development and Appeal Board Bylaw be brought to the May 27th, 2013 Council meeting for consideration of 1st reading as amended; and Bylaw 1575/2008, being the Nuisance and Unsightly Premises Bylaw, be brought forward to a future Committee of the Whole meeting for review. – Carried

D) Water in River Valley
Councillor Crozier moved that administration contact the property owners in River Valley and set up an initial meeting with them and the Water Treatment Plant Committee in order to discuss the potential for providing treated water to existing and future properties. – Carried Unanimously.

E) Commenting on Planning Documents
Re: Cypress County & City of Medicine Hat
Councillor Steinke moved that administration bring forward Policy 119 to a future Council meeting for consideration. – Carried Unanimously.

F) Policy 118, Rec-Tangle Ice Schedule Policy
Councillor Crozier moved that Policy 118 as discussed be sent to the Recreation Services Board for input and be brought forward to a future Council meeting for consideration. – Carried Unanimously.

G) Bylaw 1751/2013, Encroachment Permit Bylaw
Councillor Brown moved that proposed bylaw 1751/2013 being the Encroachment Permit Bylaw be brought to the May 27, 2013 Council meeting for consideration of first reading. – Carried Unanimously.

4. ADJOURNMENT

Councillor Brown moved the meeting be adjourned at 6:25 p.m. – Carried Unanimously.

_____
Chairman

_____
Manager of Legislative and Land Services

Redcliff Family and Community Support Services Board
Tuesday, May 14, 2013 at 7 pm
Town Office Meeting Room, Downstairs

Present: Diane MacNaughton, Ernie Reimer, Ann Pudwell, and Cindy Murray
Absent with regrets: Sam Wertypora

(D. MacNaughton left at 8:00 pm)

1. CALL TO ORDER
The meeting was called to order at 7:10 pm.

2. ADDITIONS/DELETIONS
None.

3. APPROVAL OF THE AGENDA
D. MacNaughton moved approval of the agenda. CARRIED.

4. APPROVAL OF THE MINUTES
S. Wertypora moved approval of the minutes of the February 12, 2013 meeting.

5. BUSINESS ARISING FROM THE MINUTES
Representatives from the Community Food Connections Association spoke to Council regarding the Food Charter on May 13, 2013 at the Town Council meeting. Council moved to authorize signing of the Food Charter.

6. OLD BUSINESS
6.1 Policies and Procedures
None.

6.2 Volunteer and Citizen of the Year Celebration
The Volunteer and Citizen of the Year Celebration was held on April 26, 2013 at the Royal Canadian Legion Branch #6 and was attended by 165 people including LaVar Payne, MP and a representative from the MLA's office. Twenty eight plaques were awarded to the Volunteers of the Year and Stewart Thomas was named Citizen of the Year.

The theme was "Volunteers are the Stars of the Community" so the venue was decorated with gold stars and balloons as well as a Hollywood Walk of Fame star for each of the Volunteers of the Year. "Award statuette" cookies made by the Redcliff Bakery.

6.3 Summer Programs

The Community Programs and Event Guide for May to August 2013 was recently completed and mailed out as well as posted on the website. In addition to the events in the guide, D.R.E.A.M.S. (Developing Redcliff's Education And Mental health Supports) provided funding for a 5 week program called Yoga Playdates. This free weekly program will provide beginner yoga instruction outdoors at I.F. Cox while the kids enjoy the playground.

Community Services will have an intern this summer to provide free recreation activities and programs with a focus on teens. As only non-profit organization can apply to the Serving Communities Internship Program (SCiP), the Community Food Connection Association applied on behalf of Community Services.

6.4 Blended Family Support Group

The Blended Family Support Group offered by Redcliff FCSS, D.R.E.A.M.S. (Developing Redcliff's Education And Mental health Supports) and L.E.A.R.N. (Lifelong Education and Resource Network) did not run. The session will be offered again in the fall.

6.5 Community Connections

Nineteen organizations will participate in Community Connections, a community information day, to be held from 4 – 7 pm on May 30, 2013 at the Rec-Tangle. There will also be a BBQ, bike rodeo, helmet safety and the S.I.D.N.E. (Simulated Impaired DriviNg Experience) in the Rec-Tangle parking lot.

6.6 FCSS Grant Application

A. Pudwell suggested additional changes to the FCSS Grant Application form. The changes will be made and forwarded to the FCSS board members for review before it is available to the public.

6.7 Prairie Canada Futures Planning Game

Redcliff Improvement Organization committee members played the interactive Prairie Canada Future Game that allows participants to experience the challenges of economic and community development. Small teams make a series of critical decisions that shape the future of a typical prairie region over a 25-year period.

Committee members suggested that this it would be beneficial for Council and Board members to play the game in the fall after the election.

7. DIRECTORS REPORT

Children and Youth Mental Health Awarenss Day – Town of Redcliff representatives participated in the Children' and Youth Mental Health Awareness Day march on Tuesday, May 7. Students marched from Margaret Wooding to I.F Cox then Parkside schools. It proceeded through downtown and ended with speeches in Legion Memorial Park.

Community Garden – A chain link fence, purchased with funds received through Thrive for Wellness, was erected around the Community Garden.

8. NEW BUSINESS

8.1 Redcliff Action Society for Youth

The year end report from the Redcliff Action Society for Youth has been received for information.

(D. MacNaughton left at 8:00 pm)

8.2 Needs Assessment Reviews

Tabled.

9. UPCOMING CONFERENCES/WORKSHOPS/MEETINGS

9.1	**Safety Day/Community Connections**	**Redcliff**	**May 20**
9.2	**D.R.E.A.M.S. Advisory Meeting**	**Redcliff**	**June 5**
9.3	**Mennonite Ladies Information Fair**	**Redcliff**	**June 20**

10. CORRESPONDENCE

None.

11. NEXT MEETING - June 11, 2013

12. ADJOURNMENT

The meeting was adjourned at 8:10 pm.

MUNICIPAL PLANNING COMMISSION MEETING
WEDNESDAY, MAY 15, 2013 – 12:30 PM
TOWN OF REDCLIFF COUNCIL CHAMBERS

MINUTES

PRESENT:	Members:	J. Beach, B. Duncan, B. Lowery, B. Vine, L. Leipert
	Public Services Director	D. Schaffer
	Development Officer	B. Stehr
ABSENT:	Member	S. Wertypora
	Planning Consultant	K. Snyder

1. CALL TO ORDER

B. Duncan called the meeting to order at 12:30 p.m.

2. ADOPTION OF AGENDA

B. Vine moved that the agenda be adopted as presented. - Carried.

3. PREVIOUS MINUTES

J. Beach moved the minutes of the April 17, 2013 meeting be adopted as presented. – Carried.

4. LIST OF DEVELOPMENT PERMITS ADVERTISED

The Commission reviewed the development permits as advertised in the Cypress Courier / Commentator on April 16, and April 23, 2013. The Development Officer advised that no appeals were received.

B. Duncan questioned if Development Permit 13-DP-019 for farmers market baking needed to upgrade his kitchen to commercial standards. The Development Officer mentioned that this is not something that the Town of Redcliff could enforce, and would fall under Provincial or Federal jurisdiction. Further, one of the conditions of the Development Permit is that the applicant must meet all Provincial and Federal Regulations.

5. DEVELOPMENT PERMIT FOR MPC CONSIDERATION

A) Development Permit Application 13-DP-026
TriVentrues
Lot 47, Block 34, Plan 1212279 (221 8Street SW)
Greenhouse Expansion

The Commission reviewed Development Permit Application 13-DP-026 for a Greenhouse expansion. The Development Officer informed the Commission that in the H – Horticultural District a Greenhouse is a permitted use; however, the proposed side yard setback of 1.37 m exceeds his authority. The Development Officer noted that 1.37 m is within the 10 % variance power of the MPC. Further there is a portion of the structure that extends into 2nd Street SW.

The Development Officer further remarked that the Applicant identified 6 parking stalls, and did not identify a storage area as per the Land Use Bylaw. The Development Officer advised that he had contacted Benchmark Geomatics regarding the on-site storage and Benchmark advised that

that there was adequate room for storage on the plan, and that they have been trying to contact R. Wagenaar to determine the location of the storage.

The Development Officer expressed concerns regarding the lack of parking as there appears to be a retail site near where the 6 parking stalls have been identified. TriVentures did not identify any retail space on the Development Permit Application and the concern is that if a retail space was ever opened at this location, there would be inadequate parking for customers, employees, and any greenhouse related vehicles.

Discussion ensued with regard to whether the Commission should identify the storage space, and if that area that appears to be retail space could be used for storage. The Development Officer advised that developer should identify the exact location for the storage on the Development Permit Application.

B. Duncan questioned the encroachment onto 2nd Ave. SW. The Development Officer advised that the Commission did not have the authority to address the encroachment issue. The Development Officer referred to K. Snyder's comments on how to best deal with the encroachment issue.

One of K. Snyder's recommendations was to table the permit until the storage was identified. B. Vine commented that the building was already built and being used and holding up the Development Permit until the next MPC meeting would not unduly affect TriVentures.
The Development Officer confirmed that MPC has the authority to make the decision to table the Development Permit.

Discussion ensued with regard to the parking concerns if the Development Application was tabled. The Development Officer informed the Commission that the Land Use Bylaw states that there should be 1 parking stall for every 1400 m² or as per the Development Authority for a greenhouse. The Commission, could allow just the 6 parking stalls if they deemed that this is sufficient parking.

B. Duncan questioned if the Developer could buy more land from the Town for parking on 2nd Avenue SW. The Development Officer informed the Commission that that would be fine, but the Commission did not have the authority to make that a condition of the Development Permit.

Discussion ensued with regard to how the Commission would know if the Town was going to sell the land. The Development Officer mentioned that it would be up to the Town if they wanted to sell the land. It was suggested that the MPC allow the Town to deal with the encroachment before the MPC issued a decision.

J. Beach commented that the Commission could not do anything with the development application with the information in front of them. J. Beach questioned if the Application was incomplete. The Development Officer advised that the only item missing was that storage had not been identified on the application.

L. Leipert questioned if the property had to be rezoned before approval. The Development Officer mentioned that rezoning could be a condition of the Development Permit.

Concerns were expressed with regard to whether the Commission decided to table the application that it would exceed the requirement for a decision to be made within 40 days. The Development Officer advised that the applicant can apply for an extension of the timelines for a decision and that there would be no additional costs to the applicant.

L. Leipert commented that the Town may not have addressed the encroachment onto 2 Avenue within the extension. The Development Officer reminded the Commission that they may approve the Application subject to purchasing enough land from the Town of Redcliff to meet the required setbacks.

B. Duncan questioned if the Commission could give approval for the Application subject to the 5 conditions recommended by the Development Officer.

B. Lowery questioned if the Commission were to give approval, would the Applicant still have to take care of the concerns of parking when purchasing land from the Town of Redcliff. The Development Officer commented that Town Council did not have the authority to make Development Decisions. Parking concerns would have to be addressed by the Development Authority, the MPC in this case.

J. Beach questioned if the Development hinged on whether the Applicant purchased the land from the Town of Redcliff. The Development Officer mentioned that the Applicant would also have the option of removing the encroachment.

B. Duncan questioned if the Commission was willing to relax the parking guidelines down to 6 parking stalls, and if they weren't, could they suggest that the Applicant purchase more land from the Town for parking. The Development Officer asked the Commission if 6 parking stalls were not adequate for the Commission was there some direction that the Development Officer may give to the Applicant as to what MPC is looking for.

B. Duncan mentioned that purchasing enough land on 2nd Avenue SW to accommodate 6 more parking stalls would in the opinion of the MPC be adequate for this Application.

J. Beach moved Development Permit Application 13-DP-026 be tabled as the development application was incomplete due to storage not being identified. – Carried.

B) Development Permit Application 13-DP-027
LDB Contracting
Lot 44, Block 121, Plan 9810300 (213 3 Street NW)
Accessory Building – Detached Garage

The Commission reviewed Development Permit Application 13-DP-027 for an Accessory Building - Detached Garage in regard to variance to height of 4.54 m. The Development Officer noted that the MPC has the authority to vary the height to a maximum of 10%. The height of 4.54 m is within the 10 % variance power of the MPC.

L. Leipert moved that Development Permit Application 13-DP-027 be approved with the following conditions:

1. Relocation of affected utility services to the satisfaction of all utility departments with the applicant being responsible for all costs. The applicant is responsible to ensure that the development does not interfere with the utilities, and utility right of way (UROW).

2. Exterior cladding shall match the house or to be similar to the neighbourhood.
   - Carried

C) Development Permit Application 13-DP-030
Advance Design & Construction
Lot 13, Block 1, Plan 0411924 (2400 Highway Drive SE)
Office Addition

The Development Officer advised the Commission that the proposed development was for an oil gas servicing industry. In this land use district, oil and gas servicing are Municipal Planning Commission – Discretionary, and as such is being brought before the MPC.

B. Vine questioned if they needed a new site drainage plan. The Development Officer advised the Commission that the Manager of Engineering had approved the grade plan; however it had not as yet been signed off.

D. Schafer moved that Development Permit Application 13-DP-030 be approved with the following conditions:

1. Provision of a site grading plan to the satisfaction of the Manager of Engineering

2. Office addition to meet Section 90.8.1-0 (Site Development Requirements) of the Town of Redcliff Land Use Bylaw.

3. Relocation of affected utility services to the satisfaction of all utility departments with the applicant being responsible for all costs. The applicant is responsible to ensure that the development does not interfere with the utilities, and utility right of way (UROW).

6. ADJOURNMENT

B. Lowery moved adjournment of the meeting at 1:05 p.m. - Carried

_____
Chairman

_____
Secretary

Minutes for the Board of Directors Regular Meeting

Wednesday April 17, 2013 9:10 a.m. EDA Board Room

ATTENDED:

Jim Steinke	Randy Lehr	Gordon Reynolds	Ron Edwards
Jacqueline Penner	Ron Harty	Janet Vas	Keith Crush

REGRETS:

Perry Deering	Wayne Craven

STAFF:

Wendy Blackwell	Nichola Kondra
Mary-Ann Smith	Jade Kent – MHC Practicum student

1. Call to Order at 9:10 am

2. Adoption of Minutes for March 20, 2013

   Motion to adopt the minutes of the March meeting: Jacqueline Penner. Seconded by: Jim Steinke. Carried.

3. Financial Report

   In Wayne's absence, Wendy gave the financial report

   2013 expenses are looking good.

   Motion to adopt the Financial Report: Jacqueline Penner. Seconded by: Ron Harty. Carried.

4. Executive Director Report

   Attached report was reviewed.

   Staff will meet for their first session with a Government of Alberta (GOA) facilitator to produce a team charter. A team charter is a document that defines the purpose of a team, expected outcomes and how the team will work together for results. It helps to ensure that everyone is on the same page. The facilitator will work with the EDA team over two sessions during April and will be providing her support to the EDA free of charge. She would also be available to support future EDA board strategic planning sessions.

   Wendy will be attending the Accelerate 50 seminar in Lethbridge, May 1, 2013.

Savour the Southeast – Eat Local Week

- Superstar Competition Awards Night at the Monarch was held. Two 14 year old boys, from Alexander Middle School, won first prize. There were 56 people in attendance.
- The results that we have been getting back from the participants are great and we have not even completed the Eat Local week
- The Medicine Hat College is interested in running the campaign next year.
- We have terrific community support with the "Eat Local Week. The Medicine Hat News has done all our printing for us.
- The Savour Connections Evening will be held May 27, 2013. This event will be a further follow-up to connect producer to retailers.

5. Committees & Projects Progress Reports

a. Associate Director Report:

This month Nichola was able to meet with two individuals regarding "Wellness Wednesday." She interviewed them on the benefits of eating local as well as some of the other sister programs which exist in the community to encourage the eating local lifestyle. Their interviews will be used on our website as well as a news release will be included on April 17th in the Medicine Hat news.

Since the launch of the Savour Eat Local week we have received two direct testimonials from participants who since being introduced to the program have acknowledged a direct correlation between the promotion and their current sales increase and desire for their business. We think these are some amazing and immediate results and expect to hear more of these successes following the post event survey.

She met with a local business owner who is in the process of expanding their current operations and was able to connect them with other community partners for further materials and assistance.

We have finished the Pulse Processing RFP and have begun seeking potential consultants for this project. The closing date for submissions is April 26th.

Nichola met with the Continuing Education faculty with the College to discuss current market skills gaps. She will be putting them in touch with some of the major employers and industrial groups as well as Alberta works to start collaborating.

b. Marketing & Communications:

We have received three leads from our new website.

c. Agriculture Committee: no report

d. Energy Committee Report: no report

6. Items for Immediate Discussion

   Jacqueline Penner presented the Draft of Policy on Polices, Draft of Policy for Board Member's Code of Conduct, and Draft of Policy for Role of Board were reviewed, changes are now pending and the documents will be available at the next meeting for a second reading or for finalization.
   Additional readings may be needed for any dramatic changes to policy documents. Policies will be scheduled for regular review as part of an ongoing process.

7. Correspondence - none

8. Chairman's Report –

   Thanks for the support for the 2012/13 year and hope to have the same in the on coming year.

   We need to move forward in a positive way, speak as one positive voice. As a board we need to be proactive and let the public know what we are doing. We need to be open to change and model our company accordingly. We need to focus on a long term strategic plan. Look at committees structures to give us the best support and direction. We need to complete our policies and keep them updated and have a structured reviewing process.

9. New Business - none

10. Round Table

    Everyone reported on what was happening in their respective communities.

11. Adjournment 10:35 a.m.
    Motion to Adjourn

NEXT BOARD MEETING: WEDNESDAY May 15, 2013
8:00 A.M.

TOWN OF REDCLIFF
BYLAW NO. 1742/2013

A BYLAW OF THE TOWN OF REDCLIFF to establish the Subdivision and Development Appeal Board and prescribe its role and responsibilities.

This Bylaw shall be known as the "Town of Redcliff Subdivision and Development Appeal Board Bylaw".

WHEREAS the *Municipal Government Act* states that Council may by Bylaw establish a **Subdivision and Development Appeal Board**;

NOW THEREFORE THE MUNICIPAL CORPORATION OF REDCLIFF, IN COUNCIL ASSEMBLED, ENACTS AS FOLLOWS:

INTERPRETATION

1. In this Bylaw the following terms (unless the context specifically requires otherwise) shall have the following meaning:

   a) "Act" means the *Municipal Government Act*, as amended from time to time.

   b) "Alternate" means a duly appointed member of the Subdivision and Development Appeal Board that is specifically named and titled as an alternate and such alternate shall assume all duties and rights of a full-time member should any full-time member be:

      i) unable to attend a hearing of the Subdivision and Development Appeal Board; or

      ii) declares he is abstaining from participation in a specific hearing to be held by the Subdivision and Development Appeal Board.

   c) "Appellant" means the person who has served written notice of an appeal on the Subdivision and Development Appeal Board from a decision, order or development permit issued by the Redcliff Subdivision Approving Authority, Development Officer or the Municipal Planning Commission.

   d) "Community at large" means the persons residing within the corporate boundaries of the Town of Redcliff

   e) "Council" means the Council of the Town of Redcliff.

   f) "Development" shall be defined as outlined in the current Land Use Bylaw of the Town of Redcliff.

   g) "Development Application" means an application made to the Town in accordance with the Land Use Bylaw for the purpose of obtaining a Development Permit.

   h) "Development Officer" means a person appointed to the office of development officer pursuant to the Land Use Bylaw, or the Municipal Planning Commission.

i) "Development Permit" means a document authorizing a development proposal in accordance with the Land Use Bylaw.

j) "Land Use Bylaw" means a Bylaw of the Town of Redcliff adopted by Town Council as a Land Use Bylaw and all amendments thereto, in accordance with the *Act*.

k) "Member" means a member of the Subdivision and Development Appeal Board duly appointed by Town Council pursuant to this Bylaw.

l) "Municipal Manager" means a person appointed by Town Council as Municipal Manager in accordance with the *Municipal Government Act*.

m) "Municipal Planning Commission", "Planning Commission" or "Commission" means the Town of Redcliff Municipal Planning Commission established by Council pursuant to the *Act*.

n) "Secretary" means the Municipal Manager or the individual the Municipal Manager has directed to perform the secretarial duties of the Board.

o) "Subdivision" means a subdivision application submitted to the Redcliff Subdivision Approving Authority that has had a decision made.

p) "Subdivision and Development Appeal Board" means the Subdivision and Development Appeal Board established by Council pursuant to this Bylaw in accordance with the *Act*.

ESTABLISHMENT AND COMPOSITION

2. A Subdivision and Development Appeal Board is hereby established under the name of Redcliff Subdivision and Development Appeal Board, or the Subdivision and Development Appeal Board.

3. The Subdivision and Development Appeal Board shall be composed of a minimum of five (5) members and a maximum of seven (7) as well as two (2) alternates being:

   Members
   a) two (2) Councillors as appointed by Redcliff Town Council;
   b) minimum of three (3) and a maximum of five (5) citizens at large as appointed by Redcliff Town Council.

   Alternate Members
   a) one (1) Councillor appointed by Redcliff Town Council;
   b) one (1) Citizen at large as appointed by Redcliff Town Council.

4. Members appointed who are Councillors of the Town of Redcliff shall be appointed annually at the Organizational Meeting of Redcliff Town Council.

5. A citizen at large member or alternate shall be appointed for a term of up to three (3) years to expire on December 31 of the year which shall be established when they are appointed.

6. The Subdivision and Development Appeal Board may make its rules as are necessary for the conduct of its meetings and its business in accordance with the *Act* and this Bylaw.

TERMINATION OF APPOINTMENTS

7. Subject to Section 8(b) below, the rules of conduct relating to pecuniary interest contained in the *Municipal Government Act*, as amended from time to time, shall be deemed to apply mutatis mutandis to members of the Board.

8. Council may by resolution terminate the appointment of any member of the Board if:

   a) the member is absent from three (3) consecutive meetings of the Board;

   b) the member violates the rules of conduct referred to in Section 7 above;

   c) the member uses information gained through his position as a member of the Board to gain a pecuniary benefit in respect of any matter in which he has a pecuniary interest, or;

   d) the member otherwise conducts himself in a manner that Council considers to be improper.

9. A member of the Board's appointment shall automatically terminate if the member ceases to be a member of the Community at large.

10. The appointment of a member of the Board may at any time be revoked by resolution of Council.

APPOINTMENT OF CHAIRMAN

11. The members of the Subdivision and Development Appeal Board shall at each meeting elect by majority vote a member who shall act as the Chairman of the Subdivision and Development Appeal Board for that hearing.

12. The Chairman or such other person authorized by the Subdivision and Development Appeal Board for the purpose, shall sign all notices of decisions and other documents on behalf of the Board relating to any jurisdiction or power of the Board.

13. Any document that has been signed by the Chairman or the authorized person shall be deemed to have been signed on behalf of and with the approval of the Subdivision and Development Appeal Board.

14. Every member shall vote on every matter placed before the Subdivision and Development Appeal Board:

    a) unless in a specific case, the Chairman or member is excused by resolution of the Board from voting, or

    b) unless disqualified from voting by reason of pecuniary interest.

APPOINTMENT AND DUTIES OF SECRETARY

15. The Secretary shall perform such functions as may be necessary to assist the Subdivision and Development Appeal Board to fulfill its duties under the Act and this Bylaw.

16. The Secretary shall maintain a written record with respect to:

    a) the minutes of all meetings and public hearings;

    b) all applications for appeals;

    c) copies of all written representation to the Subdivision and Development Appeal Board;

    d) a summary of any verbal evidence presented to the Subdivision and Development Appeal Board;

    e) the names and addresses of those persons making representation to the Subdivision and Development Appeal Board;

    f) the decisions together with the reasons of the Subdivision and Development Appeal Board;

    g) copies of all notices of decisions and to whom they were sent.

17. The Secretary shall:

    a) notify all members of the Subdivision and Development Appeal Board of the arrangements for holding each hearing and other meetings

    b) make available for public inspection all relevant documents and materials respecting appeals and all appeal decisions.

DUTIES OF THE SUBDIVISION AND DEVELOPMENT APPEAL BOARD

18. The Subdivision and Development Appeal Board shall meet at such intervals as are necessary to hear subdivision and development appeals in accordance with the Act, this Bylaw and the Land Use Bylaw.

    ~~a) hear subdivision and development appeals in accordance with the *Act*, this Bylaw and the Land Use Bylaw; and~~

~~b) carry out reviews of any remedial orders made under the Nuisance and Unsightly Premises Bylaw.~~

19. The Subdivision and Development Appeal Board shall hold a public hearing within thirty (30) days of receipt of a notice of appeal duly filed in accordance with this Bylaw, the Land Use Bylaw, a subdivision application and the *Act*.

20. The Subdivision and Development Appeal Board shall make available for public inspection, before the commencement of the public hearing, all relevant documents and materials respecting the appeal.

21. The Secretary, shall give at least five (5) days notice in writing of the public hearing to:

a) In the case of a Development Appeal to:

i) the appellant,

ii) the development authority whose order, decision or development permit is the subject of the appeal, and

iii) those owners required to be notified under the land use bylaw and any other person that the subdivision and development appeal board considers to be affected by the appeal and should be notified.

iv) Such other person as the Subdivision and Development Appeal Board specifies.

b) In the case of a Subdivision Appeal to:

i) the applicant for the subdivision approval,

ii) the subdivision authority that made the decision,

iii) If land that is the subject of the application is adjacent to the boundaries of another municipality, that municipality,

iv) any school board to whom the application was referred, and

v) every Government department that was given a copy of the application pursuant to the subdivision and development regulations.

vi) Owners of land that is adjacent to land that is the subject of the application to the Satisfaction of the Subdivision and Development Appeal Board and in conforming with the Act.

c) In the case of a Review of a ~~Remedial~~ Stop Order to:

i) Owner or occupant to whom the order was issued
ii) Other persons who the Municipal Manager, or his designate, considers to

be affected.

22. At the Public Hearing, the Subdivision and Development Appeal Board shall hear:

a) the appellant or any person acting on his behalf;

b) the Development Officer or a representative of the Municipal Planning Commission from whose order, decision or development the appeal is made;

c) a representative(s) of the Redcliff Subdivision Approving Authority;

d) any other person who was served with notice of the hearing;

e) any other person or his agent who claims to be affected by the order, decision, or permit and that the Subdivision and Development Appeal Board agrees to hear.

f) the owner or occupant to whom a ~~Remedial~~ Stop Order was issued to.

RIGHT OF APPEAL

23. A person may appeal to the Subdivision and Development Appeal Board where:

a) the Development Officer, Municipal Planning Commission or Redcliff Subdivision Approving Authority as the case may be,

i) refuses or fails to issue a development permit or subdivision approval, or

ii) issues a development permit or subdivision approval subject to conditions, or

iii) issues an order under the Act.

b) no decision on the application for a development permit is made within forty (40) days of receipt of the completed application.

c) no decision on the application for a subdivision is made within

i) 21 days from the date of receipt of the completed application in the case of a completed application for a subdivision described in section 652(4) of the *Act* if no referrals were made pursuant to section 5(6) of the Subdivision and Development Regulation,

ii) 60 days from the date of receipt of any other completed application under section 4(1) of the Subdivision and Development Regulation, or

iii) the time agreed to pursuant to section 681(1)(b) of the *Act*.

d) a ~~remedial order has been issued pursuant to Section 547 of the Act and/or the Nuisance and Unsightly Premises Bylaw~~ stop order issued pursuant to Section 645 of the Act.

24. A person affected by an order, decision or development permit made or issued by the Development Officer, Municipal Planning Commission or Redcliff Subdivision Approving Authority as the case may be, other than a person having a right of appeal under Section 23(a) of this Bylaw may appeal to the Subdivision and Development Appeal Board in accordance with the *Act* and this Bylaw.

25. An appeal to the Subdivision and Development Appeal Board shall be commenced by serving a written notice of the appeal on the Board within fourteen (14) days after:

    a) in the case of an appeal made by a person referred to in Section 23 the date on which:

        i) the person is notified of the order, decision, the issuance of the development permit or subdivision approval, or

        ii) if no decision is made with respect to the application for a development permit, the forty (40) day period and any extension of that period referred to in Section 23(b) of this Bylaw.

        iii) if no decision is made with respect to the application for a subdivision, the time requirements listed in Section 23(c) of this Bylaw.

    b) in the case of an appeal by a person referred to in Section 24 of this Bylaw, the date on which the notice of the issuance of the development permit was given in accordance with the Land use Bylaw.

    ~~c) In the case of an appeal of a remedial order the owner or occupant to whom a remedial order is issued~~

        ~~i. Within fourteen days of the receipt of the remedial order relating to a nuisance:~~

        ~~ii. Within seven days of receipt of the remedial order relating to an unsightly or dangerous condition~~

        ~~iii. Or such longer period as may be specified in the remedial order~~

26. The written notice of the appeal shall be made on the Subdivision and Development Appeal Form as prescribed by Council resolution from time to time and signed by the Appellant and accompanied by a fee detailed in the Town of Redcliff Rates Policy adopted by Council. The fee is to be paid at time of appeal.

27. The Appellant may serve the Subdivision and Development Appeal Form on the Board by either:

    a) registered or certified mail addressed to:

        Municipal Manager
        Town of Redcliff
        1 - 3 Street N.E., Box 40
        Redcliff, Alberta, T0J 2P0

or

b) delivering it in person to the Office of the Municipal Manager in the Town Hall to reach/deliver no later than the fourteenth (14th) day (including Saturdays, Sundays and holidays) after the person is notified in accordance with the Land Use Bylaw, development permit issued by the Development Office or the Municipal Planning Commission, or Redcliff Subdivision Approving Authority as the case may be.

NOTICE OF PUBLIC HEARING

28. Upon receipt of notice of appeal duly filed pursuant to the provisions of this Bylaw, the Land Use Bylaw, and the *Act*, the Municipal Manager, or his designate shall:

a) set a date, time, and place for a public hearing to be held within the time limit prescribed under this Bylaw, and

b) ensure that the requirements of Section 21 of this Bylaw are fully complied with.

QUORUM

29. The members of the Subdivision and Development Appeal Board who are Town of Redcliff Councillors shall not form the majority of members at any hearing.

30. If any appeal is related to a Subdivision decision, no member of Council can sit on the board to hear the appeal. Similarly, if an appeal is initiated by Council no member of Council can sit on the board to hear said appeal.

31. Subject to Section 29 and 30, the majority of the appointed full time members of the Subdivision and Development Appeal Board shall constitute a quorum at any meeting of the Board. Should members of Council be unable to sit on the board to hear an appeal, quorum will be determined by the majority of the remaining full time members of the board.

32. Only the members present during the entire length of the discussion pertaining to a matter being considered at a public hearing or meeting of the Subdivision Development Appeal Board shall be allowed to vote on the appeal.

COMPLIANCE WITH STATUTORY PLANS AND LAND USE BYLAW

33. In determining an appeal, the Subdivision and Development Appeal Board:

a) in regard to Subdivision Approval or Development Permits shall comply with any regional plan, statutory plan and subject to Clause (b), the Land Use Bylaw in effect;

b) in regard to a Development Permit may make an order, decision, issue or confirm the issuance of a Development Permit notwithstanding that the proposed development does not comply with the Land Use Bylaw, if in its opinion,

i) the proposed development would not unduly interfere with the amenities of the neighbourhood, or

ii) materially interfere with or affect the use, enjoyment or value of neighbouring properties,

iii) the proposed development conforms with the use prescribed for that land or building in the Land Use Bylaw; and.

d) in regard to a Subdivision Approval,

i) must be consistent with the land use policies;

ii) must have regard to but is not bound by the subdivision and development regulations;

iii) may confirm, revoke or vary the approval or decision or any condition imposed by the subdivision authority of make or substitute an approval, decision or condition of its own;

iv) may, in addition to the other powers it has, exercise the same power as a subdivision authority is permitted to exercise pursuant to the *Act*.

DECISIONS

34. The Subdivision and Development Appeal Board may confirm, revoke or vary the order, decision or development permit, subdivision or any condition attached to any of them or make or substitute an order, decision or permit of its own,

35. The Subdivision and Development Appeal Board shall give its decision upon an appeal in writing together with reasons for the decision within fifteen (15) days of the conclusion of the hearing.

36. The decision of the majority of the members of the Board present at a public hearing or meeting duly convened shall be deemed to be the decision of the Board.

37. In the event of a tie vote, the motions shall be deemed to be decided in the negative.

38. Where the hearing is adjourned and the Board does not at the time of adjournment fix a time and place for a further hearing of the application and announce it to those in attendance, the Chairman of the Board shall announce to those in attendance that notice of the time and place for a further hearing will be sent only to those persons who leave their name and addresses and to whom notice is required under Section 21.

39. Where the Subdivision and Development Appeal Board allows an appeal against the refusal of a permit by the Development Officer or the Municipal Planning Commission, as the case may be, the Development Officer shall issue a Development Permit in conformity with the Board's decision.

40. Where the Subdivision and Development Appeal Board allows an appeal against the refusal of a subdivision application by the Redcliff Subdivision Approving Authority, the Authorized Signing Officer for the Redcliff Subdivision Approving Authority shall issue an approval in conformity with the Board's decision.

41. In accordance with the Municipal Government Act, section 197 (2.1) the Subdivision and Development Appeal Board may deliberate and make its decision in meetings closed to the public.

APPEALS TO COURT OF LAW

42. A decision made by the Subdivision and Development Appeal Board on a development appeal or subdivision application is final and binding on all parties and persons subject only to a judicial review upon a question of jurisdiction or law pursuant to the *Municipal Government Act*.

43. The Secretary shall keep on file all notices of application made for leave to appeal to the Appellant Division from the decisions of the Subdivision and Development Appeal Board in accordance with the *Act*.

CONFIDENTIALITY

44. The Board shall withhold the following information, within the possession of the Town unless its disclosure is required by this or any other enactment or by an order of the court or its disclosure is consented to by the person to whom the information relates:

a) commercial information, the disclosure of which would:
   i) likely prejudice the commercial position of the person who supplied it,
   ii) reveal a trade secret,
   iii) likely prejudice the Town's ability to carry out its activities or negotiations, or
      d) allow the information to be used for improper gain or advantage;

b) information that is subject to obligations of confidence, the disclosure of which would:
   i) likely prejudice the future supply of similar information or advice,
   ii) likely prejudice the Towns ability to carry out is activities or negotiations,
   iii) place Board members, Councillors, or employees of the Town at risk of improper pressure or harassment,
   iv) breach legal professional privilege, or
   v) prejudice measures protecting health and safety;

c) personal information, including personnel information, unless its disclosure:
   i) is for the purpose for which the information was obtained or for a consistent purpose,
   ii) is required so that the Town can carry out its duties and functions, or
   iii) is in a statistical or other form so that the name of persons are not revealed or made identifiable;

d) information of a deliberative kind and draft reports that are likely to be released to

the public in a final form in due course except when the information or draft report is placed before a meeting held in public;

e) information the disclosure of which could prejudice security and the maintenance of the law;

f) information placed before a meeting that is closed to the public, except when the information is later placed before a meeting held public;

g) information that is prohibited from being released by this or any other enactment.

REPEAL

Bylaw No. 1733/2013 is hereby repealed.

READ a first time this __ day of _____, 2013.

READ a second time this ___ day of _____, 2013.

READ a third and final time this ___day of ____, 2013.

SIGNED and PASSED this ____ day of _____, 2013.

_____
MAYOR

_____
MANAGER OF LEGISLATIVE AND LAND SERVICES

TOWN OF REDCLIFF
REQUEST FOR DECISION

DATE: May 23, 2013

PROPOSED BY: Shanon Simon, Manager of Legislative and Land Services

TOPIC: Encroachment Permits

PROPOSAL: Consider changes to the Encroachment Permit Bylaw

BACKGROUND:

At the Committee of the Whole meeting of May 13, 2013 Committee discussed the proposed changes to the Encroachment Permit Bylaw and made a motion that proposed Bylaw 1751/2013, Encroachment Permit Bylaw be brought forward to a future Council meeting for consideration of 1st Reading. Further that Policy 53, Rates Policy, be brought forward to Council for consideration to incorporate the fee for Encroachment Permits.

One of the changes proposed in the bylaw was to remove the fee and incorporate it into the Rates Policy. However, Administration is proposing that a bylaw establishing the fees be adopted versus the current practice of establishing fees by a policy. The Bylaw to establish fees is not yet ready to be presented for Council and to avoid delay in considering the new Encroachment Permit Bylaw I would like to leave the Encroachment Permit Fee in the Encroachment Permit Bylaw for the time being.

All changes otherwise proposed are highlighted.

OPTIONS:

1. Give first reading to Bylaw 1751/2013, being the Encroachment Permit Bylaw.

2, To not give first reading to Bylaw 1751/2013, being the Encroachment Permit Bylaw.

RECOMMENDATION:

It would be my recommendation to give first reading to Bylaw 1751/2013, being the Encroachment Permit Bylaw.

SUGGESTED MOTION(S):

1. Councillor _____ moved that Bylaw 1751/2013 being the Encroachment Permit Bylaw be given first reading.

SUBMITTED BY: _____ Department Head _____ Municipal Manager

APPROVED / REJECTED BY COUNCIL THIS _____ DAY OF _____, 2013.

TOWN OF REDCLIFF
BYLAW NO. ~~1177/98~~ 1751/2013

A BYLAW OF THE TOWN OF REDCLIFF for the purposes of authorizing the issuance of Encroachment Permits.

WHEREAS, it is deemed expedient and proper for a Council to authorize the issuance of an Encroachment Permit.

NOW THEREFORE THE MUNICIPAL COUNCIL OF THE TOWN OF REDCLIFF, IN THE PROVINCE OF ALBERTA DULY ASSEMBLED ENACTS AS FOLLOWS:

TITLE

1. This Bylaw shall be known as the **Encroachment Permit Bylaw**.

ENCROACHMENT PERMITS

2. Encroachment permits:

   a) where the encroaching structure does not encroach more than .31 metres onto Town of Redcliff Property the request for an encroachment permit may be approved by the Municipal Manager and such approval shall be copied to Council for information only;

   b) where the encroaching structure does encroach more than .31 metres onto Town of Redcliff Property the request for an encroachment permit shall be forwarded to Council for consideration.

3. The fee for an encroachment permit shall be in the amount of $100.00 plus GST for each encroachment permit issued.

4. Prior to the issuance of an encroachment permit the Town of Redcliff will require the owner of an encroaching structure to make application for an encroachment permit on the standard form as shown on ~~Appendix~~ Schedule "A" attached to this Bylaw and provide a copy of a Real Property Report (RPR) prepared by an Alberta Land Surveyor, or other acceptable survey identifying the encroachment.

5. The information that will be required prior to processing an encroaching permit shall include:

   a) indemnification of Town of Redcliff from any damage or liability associated with the encroaching structure;

   b) indemnification of Town of Redcliff for any damages that may occur to the encroaching structure resulting from the need to maintain or construct in the area of the encroachment;

   c) removal of the encroaching structure, at no cost to the Town of Redcliff, should in the opinion of the Town of Redcliff such structure has become dilapidated;

   d) removal of the encroaching structure, at no cost to the Town of Redcliff, should the Town of Redcliff need access to the encroached upon area in the event of utility maintenance, new utility construction or road development.

e) acknowledgement that the encroachment permit is terminable by Town of Redcliff upon issuance of 30 days notice in writing to the property owner at the last address as shown on the taxation records of the Town of Redcliff.

6. Encroachment permits may only be issued to the present owner of said encroaching structure;

7. Upon sale of the land the encroachment permit issued by the Town of Redcliff is terminated unless:

a) If the encroaching structure is sold to a different party the acquiring owner may apply for an encroachment permit to be issued providing the following conditions are met:

i) the terms and conditions on the encroachment permit to be issued are identical to the encroachment permit issued to the vendor;

ii) the request is made in writing and received by the Town of Redcliff within 60 days of the date of the original encroachment permit;

iii) the written request, includes a declaration confirming there have been no adjustments to any building on the site since the date of the issuance of the original encroachment permit.

iv) there will be no additional fee charged for issuance of this encroachment permit.

8. That effective upon passage of this Bylaw, The Council of the Town of Redcliff hereby authorizes the Municipal Manager, or his designate, to sign, on behalf of the Town of Redcliff, encroachment permits as shown on Appendix “A” attached.

9. Bylaw ~~1165/98~~ 1177/98 is hereby repealed

Read a first time this _____ day of _____, 2013.

Read a second time this _____ day of _____, 2013.

Read a third time this _____ day of _____, 2013.

Signed and Passed the this _____ day of _____, 2013.

_____
Mayor

_____
Manager of Legislative and Land Services

~~APPENDIX~~ SCHEDULE "A"

TOWN OF REDCLIFF
ENCROACHMENT PERMIT

I _____ owner of the property legally described as Lot(s)_____, Block _____, Plan _____, hereby make application for an Encroachment Permit in accordance with the right of the Town of Redcliff to issue such a permit.

I submit the information as part of this permit that the existing building(s) or structure(s) intended to be wholly situated upon the lands located at _____ legally described as: Lot(s)_____, Block _____, Plan _____, do, in fact, encroach upon a portion of:_____
as shown on the Survey Certificate attached hereto and forming part of the Permit.

The Town of Redcliff is empowered under the Land Titles Act to grant a permit with any conditions and terms that the Town may specify, to the owner of a building or structure that encroaches on a road, street, lane or other public place permitting the building or structure to remain thereon.

The Town of Redcliff grants this Encroachment Permit under the terms and conditions as follows:

i) I will provide a Real Property Report (copy to be attached to this document) at no cost to Town of Redcliff, and prepared by a Registered Alberta Land Surveyor;
ii) I will indemnify the Town of Redcliff from any damage or liability associated with the encroaching structure;
iii) I will indemnify the Town of Redcliff for any damages that may occur to the encroaching structure resulting from the need to maintain or construct in the area of the encroachment;
iv) I will agree to removal of the encroaching structure, at no cost to the Town of Redcliff, should in the opinion of the Town of Redcliff such structure has become dilapidated or damaged;
v) I will agree to removal of the encroaching structure, at no cost to the Town of Redcliff, should the Town of Redcliff need access to the encroached upon area in the event of utility maintenance, new utility construction, roadway maintenance or new roadway construction.
vi) I am aware no application for development permits on this property can, by legislation,

be approved by a development authority as long as any development on this property does not conform to the current Land Use Bylaw of the Town of Redcliff.

vii) I agree that the encroaching structure shall not be added to, rebuilt or structurally altered except:

a. as may be necessary to remove the encroachment; or

b. as may be necessary for the routine maintenance of the encroachment.

viii) I acknowledge this permit may be terminated by Town of Redcliff upon 30 days notice issued to me at the address indicated on the taxation records of the Town of Redcliff.

_____

APPLICANT

Approved on behalf of Town of Redcliff this the _____ day of _____, _____.

_____

MUNICIPAL MANAGER

TOWN OF REDCLIFF
BYLAW NO. 1753/2013

A Bylaw to authorize the Municipal Council of the Town of Redcliff to incur an indebtedness on behalf of the said Town by the issuance of debentures for the purpose of constructing a Water Treatment Plant in the Town of Redcliff.

This Bylaw shall be known as the Water Treatment Plant Borrowing Bylaw.

WHEREAS it is deemed expedient and proper pursuant to the provisions of the Municipal Government Act, that Council shall issue a bylaw to authorize financing, undertaking and construction of a Water Treatment Plant in the Town of Redcliff.

AND WHEREAS plans, specifications and estimates for such work have been made by the Town of Redcliff Engineer, whereby the total cost of said project is estimated to be Twelve Million Dollars ($12,000,000.00) and the Town estimates the following grants and contributions will be applied to the project:

Capital Reserves (from Grants)	5,500,000.00
Debentures	6,500,000.00
Total Cost	12,000,000.00

AND WHEREAS in order to construct and complete the said project, it will be necessary to borrow the sum of Six Million Five Hundred Thousand Dollars ($6,500,000.00) on the credit of the Town as herein provided.

AND WHEREAS the said indebtedness is to be repaid over a period of twenty five (25) years in annual or semi-annual installments, with interest not exceeding ten percent (10%), or the interest rate fixed from time to time by the Alberta Capital Finance Authority or other financial institution.

AND WHEREAS the principal amount of outstanding debt of the Town at December 31, 2012 is $6,698,167.00 and no part of the principal or interest is in arrears.

AND WHEREAS the estimated lifetime of the project financed under this bylaw is equal to, or in excess of Thirty (25) years.

AND WHEREAS all required approvals for the project have been obtained and the project is in compliance will all acts and regulations of the Province of Alberta

AND WHEREAS pursuant to the provisions of the Municipal Government Act, the Council has given proper notice of intention, in a form similar to Schedule "A" of this Bylaw, dated the ____ day of _____, 2013 to undertake and construct a Water Treatment Plant in the Town of Redcliff, and no sufficiently signed and valid petition against the said proposal has been received by the Council.

NOW, THEREFORE, THE MUNICIPAL COUNCIL OF THE TOWN OF REDCLIFF IN COUNCIL ASSEMBLED ENACTS AS FOLLOWS:

1. That for the purpose of constructing a Water Treatment Plant in the Town of Redcliff for the sum of Twelve Million Dollars ($12,000,000.00) be borrowed from Alberta Capital Finance Authority or other financial institution by way of debenture on the credit and security of the Town of Redcliff at large, of which amount the full sum of Six Million Five Hundred Thousand Dollars ($6,500,000.00) is to be paid by the Town at large.

2. The proper officers of the Town are hereby authorized to issue debentures(s) on behalf of the Town for the amount and purpose as authorized by this Bylaw, namely the construction of a Water Treatment Plant in the Town of Redcliff.

3. The Town shall repay the indebtedness according to the repayment structure in effect, namely semi-annual or annual equal payments of combined principal and interest installments not to exceed twenty five (25) years calculated at a rate not exceeding the interest rate fixed by the Alberta Capital Finance Authority or another authorized financial institution on the date of the borrowing, and not to exceed ten (10) percent.

4. The Town shall levy and raise in each year municipal taxes sufficient to pay the indebtedness.

5. The indebtedness shall be contracted on the credit and security of the Town.

6. The net amount borrowed under the Bylaw shall be applied only to the project specified by this Bylaw.

7. This bylaw comes into force on the date it is passed.

READ a first time this ____ day of _____, 2013.

READ a second time this ____ day of _____, 2013.

READ a third time this ____ day of _____, 2013.

SIGNED and PASSED this ____ day of _____, 2013.

_____
Mayor

_____
Manager of Legislative and Land Services

Schedule A

TOWN OF REDCLIFF

PUBLIC NOTICE

TO ELECTORS OF THE TOWN OF REDCLIFF

Province of Alberta

SECTION 251 – THE MUNICIPAL GOVERNMENT ACT

TAKE NOTICE that the Council of the Town of Redcliff, in the Province of Alberta, has given first reading to borrowing Bylaw No 1753/2013 which will, upon final passage and approval, authorize the proper officers of the said Town of Redcliff to borrow monies from the Alberta Capital Finance Authority or other financial institution by way of debenture issue, to pay for the cost of the following municipal purpose:

Construction of a Water Treatment Plant in the Town of Redcliff**.**

The total cost of the aforesaid project amount is $12,000,000.00. The net amount to be borrowed on the credit and security of the municipality at large by the issue of debentures is $6,500,000.00. The debentures are to be repayable to the Alberta Capital Finance Authority or other financial institution in accordance with the repayment structure in effect, namely semi-annual or annual equal payments of combined principal and interest installments not to exceed twenty five (25) years calculated at a rate not exceeding the interest rate fixed by the Alberta Capital Finance Authority or another authorized financial institution on the date of the borrowing, and not to exceed ten (10) percent.

A copy of the proposed Bylaw may be inspected by the public during normal office hours (8:00 a.m. – 4:30 p.m.) at the office of the Manager of Legislative and Land Services, Town Hall (#1 – 3rd Street NE, Redcliff, Alberta T0J 2P0).

NOW THEREFORE NOTICE is hereby given by the Council of the Town of Redcliff that, unless a petition of the electors for a vote on Bylaw No 1753/2013 is demanded, as provided for by the terms of the Municipal Government Act, the said Council may pass the said borrowing Bylaw.

All person interested are hereby notified and they are required to govern themselves according.

Dated at the Town of Redcliff, in the Province of Alberta, this ____ day of _____, 2013.

INFORMATION FOR ELECTORS

Pursuant to Section 1(i) of the *Municipal Government Act* an "elector" means:

A person who is eligible to vote in the election for a councillor under the *Local Authorities Election Act*.

Pursuant to section 47(1) of the *Local Authorities Election Act* a person is eligible to vote in an election if he:

a. is at least 18 years old,
b. is a Canadian citizen, and
c. has resided in Alberta for the 6 consecutive months immediately preceding election day and is resident in the area on election day.

A poll may be demanded in the Town of Redcliff by electors equal in number to at least:

a. in the case of a municipality other than a summer village, by electors of the municipality equal in number to at least 10% of the population and
b. in the case of a summer village, by 10% of the electors of the summer village

in accordance with the provisions of section 223 of the *Municipal Government Act* and in accordance with the provisions of section 251 of the *Municipal Government Act*.

The petition for a vote must be received by the Chief Administrative Officer within 15 days of the last publication of this notice and shall contain on each page "an accurate and identical statement of the purpose of the petition". (Further requirements of the petition are provided in section 224 of the *Municipal Government Act*.)

TOWN OF REDCLIFF
REQUEST FOR DECISION

DATE: May 27, 2013

PROPOSED BY: Robert Osmond, Director of Finance & Administration

TOPIC: Postage Machine

PROPOSAL: To authorize a rental agreement for a postage machine for the Town

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BACKGROUND:

The Town's current postage machine has reached the end of its useful life, and is in need of replacement. Currently, there are three different suppliers for postage machines approved by Canada Post. The three suppliers are Pitney Bowes, Neopost, and Francotyp Postalia.

While researching competitive quotes all three providers above were approached. Each company was asked to provide quotes on a machine equivalent to the current Pitney Bowes machine and for another model that provided additional value.

The required features included semi-automated mail feed, self-sealer, weight scale and the ability to provide timely support. Additional features such as fully automated mail feed, Black/Colour return address, larger scale capacity and accounting software were identified as desirable but not required.

The machines proposed by Pitney Bowes were the DM-400 (similar to current machine) and the DM-125 (one model below), by Neopost the IS-420 (similar to current machine) and the IS-350 (one model below), and by Francotyp Postalia the Optimail (similar to current machine) and Ultimail (one model above).

Although, the costs of the machines varied widely, it was clear that there is significant advantage to renting a postage machine rather than purchasing. In fact the savings over the four year useful life of renting rather than purchasing will likely be more than $5,000. This combined with the fact that in all cases the postage meter in the machine remains the property of Canada Post provides little benefit to purchasing this type of machine.

As entering into a rental agreement for a postage machine is a new operating expense and extends beyond the current annual budget cycle, the Purchasing Policy #38 requires that Council authorize the initial agreement.

Testing is now complete on Canada Post's Indicia Mailing through their Electronic Shipping Tools (EST). This process allows bulk mailings of 100 items or more (taxes, utilities, receivables, etc.) to be sent without the added cost of processing through a postage machine. By including this option in our operations there is no requirement to upgrade from the capacity of the current postage machine.

OPTIONS:

1. Council authorize Administration to enter into a four (4) year rental agreement for a Francotyp Postalia Optimail postage machine at an estimated annual cost of $420, inclusive of service and support to be funded from operations.

2. Council direct Administration to bring forward a request for decision to purchase a postage machine as outlined in the 2013 Capital Budget.

RECOMMENDATION:

That Council authorize Administration to enter into a four (4) year rental agreement for a Francotyp Postalia Optimail postage machine at an estimated annual cost of $420, inclusive of service and support to be funded from operations.

SUGGESTED MOTION(S):

1. Councillor _____ moved to authorize Administration to enter into a four (4) year rental agreement for a Francotyp Postalia Optimail postage machine at an estimated annual cost of $420, inclusive of service and support to be funded from operations.

2. Councillor _____ moved to direct Administration to bring forward a request for decision to purchase a postage machine as outlined in the 2013 Capital Budget.

SUBMITTED BY: _____ _____

Department Head Municipal Manager

APPROVED / REJECTED BY COUNCIL THIS _____ DAY OF _____ AD. **2013.**

TOWN OF REDCLIFF
REQUEST FOR DECISION

DATE: May 22, 2013

PROPOSED BY: Shanon Simon, Manager of Legislative and Land Services

TOPIC: 2013 Municipal Election – Advance Vote

PROPOSAL: Consider holding an Advance Vote for the 2013 Municipal Election

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BACKGROUND

At the Council meeting of March 11, 2013, Vic Lutz was appointed as Returning Officer for the upcoming election. He has since accepted this appointment.

Section 73 of the Election Act states:

1) An elected authority may by resolution provide for holding an advance vote to be held in an election.
2) No advance vote shall be held within 24 hours of an election day.
3) If a resolution is enacted under Subsection (1), the returning officer must determine the days and hours with the advance vote is to be held.

Having an advance vote has been the typical practice in past elections. V. Lutz and I have recently met and he would again suggest holding an Advance Vote. He has tentatively selected Thursday, October 10, 2013 from 12:00 – 8:00 p.m at the Redcliff Library for an Advance Vote if Council does authorizes holding an Advance Vote.

OPTIONS:

1. Council authorizes holding an Advance Vote for the 2013 Municipal Election.

2. Council does not authorize holding an Advance Vote for the 2013 Municipal Election.

RECOMMENDATION:
That an Advance Vote be held for the 2013 Municipal Election.

MOTION:

1. Councillor _____ moved that an Advance Vote be held for the 2013 Municipal Election.

2. Councillor _____ moved that no Advance Vote be held for the 2013 Municipal Election.

SUBMITTED BY: _____ Department Head _____ Municipal Manager

APPROVED / REJECTED BY COUNCIL THIS _____ DAY OF _____, 2013.

TOWN OF REDCLIFF
REQUEST FOR DECISION

DATE: May 27, 2013

PROPOSED BY: David Wolanski, Municipal Manager

TOPIC: Commenting on IDP Planning applications

PROPOSAL: To consider adopting a policy on dealing with IDP applications

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BACKGROUND:

As Council is aware the Inter-Municipal Development Plan (IDP) was approved by all three municipalities (Redcliff, Medicine Hat, Cypress County) in 2011. Prior to the development of the IDP there was no clear direction as to planning in the fringe areas. As such, it was very important for the Town of Redcliff, especially Council, to have each application for development in fringe areas around the Town come to Council for discussion and input into potential suggestions and/or opposition if appropriate.

The IDP now clearly spells out how development in the designated areas should occur and development applications brought forward by someone in the City of Medicine Hat or Cypress County must comply with the parameters of the IDP or an amendment must be sought. As required under the IDP, such applications must be sent to the municipalities for comment. It is our understanding that both Cypress County and the City of Medicine Hat allow the qualified planning departments to perform their responsibilities and provide said comments without Council approval.

It has been the Town's practice to bring forward these applications to Council for a resolution indicating whether there were any comments or concerns. This practice was much more applicable prior to the development of the IDP; however, even then a resolution may not have been the correct process according to roles and responsibilities of administration and Council as identified in the *MGA*. The other issue we continue to have is when there are deadlines on providing comments that often do not meet within the timelines of Council meetings.

The approval of the IDP requires that this practice be reviewed and administration is proposing a policy to more clearly identify how to deal with these applications.

Council discussed Policy 119 at the COW meeting on May 13, 2013 and passed a resolution to bring forward the policy as presented for consideration. Part of the discussion was regarding the necessity of having a section dealing with time sensitive documents/applications and why that should even be the case considering timelines are legislated. I spoke to Cypress County and the comment was that in most cases they try to send the information to Redcliff immediately following first reading; however, sometimes there are administrative process errors where things get forgotten or delayed due to the volume of applications they sometimes received. This was the case recently. As such, I left that section in the policy.

Proposed Policy 119 is attached.

OPTIONS:

1. Approve Policy 119 as presented.

2. Approve Policy 119 as amended.

RECOMMENDATION:

Option 1 as discussed at the previous COW meeting seeing how no new information would facilitate any administrative suggested changes.

SUGGESTED MOTION(S):

1. Councillor _____ moved that Policy 119 External Municipal Planning Documents Review Policy be approved as presented.

2. Councillor _____ moved that Policy 119 External Municipal Planning Documents Review Policy be approved as amended.

SUBMITTED BY: _____ Department Head

_____ Municipal Manager

APPROVED / REJECTED BY COUNCIL THIS ___ DAY OF ___ AD. **2013.**

Approved by Council –

EXTERNAL MUNICIPAL PLANNING DOCUMENTS REVIEW POLICY

BACKGROUND

The Inter-Municipal Development Plan (IDP) was approved by all three municipalities (Redcliff, Medicine Hat, Cypress County) in 2011. Prior to the development of the IDP there was no clear direction as to planning in the fringe areas. As such, it was very important for the Town of Redcliff, especially Council, to have each planning document or application in fringe areas around the Town come to Council for discussion and input into potential suggestions and/or opposition if appropriate.

The IDP now clearly spells out how development in the designated areas should occur and applications or documents brought forward by or behalf of someone in the City of Medicine Hat or Cypress County must comply with the parameters of the IDP or an amendment must be sought. As required under the IDP, such documents must be sent to the municipalities for comment. While the IDP attempts to identify the majority of situations, administration recognizes that it would have been impossible to contemplate every scenario. Applications/documents with impact to the Town of Redcliff should be provided to Council for their information and input.

This policy identifies how these items will be dealt with by the Town of Redcliff.

POLICY

Applications/Documents dealing with lands south of the South Saskatchewan River

Applications/Documents that are for lands south of the South Saskatchewan River generally have little to no impact on the Town of Redcliff; however, must still comply with the restrictions within the IDP. Any such application/documents will be responded to by administration, in consultation with the Town planning consultant regardless of time restrictions.

Applications/Documents dealing with land north of the South Saskatchewan River

Applications/Documents that are for lands north of the South Saskatchewan River have the potential to be of greater impact to the Town of Redcliff. Any such applications/documents will be forwarded to Council for information and input and responded to by administration, in consultation with the Town planning consultant.

Applications/Documents that are time sensitive

Applications/Documents that are for lands north of the South Saskatchewan River that require a response prior to an opportunity to forward them to Council for information and input will be responded to by administration, in consultation with the Town planning consultant, and brought to Council for information at the next available Council meeting, along with the comments provided by administration.

Applications/Documents that have broader IDP implications

Applications/Documents that have broader IDP implications, regardless of location, will be forwarded to Council for information and input and responded to by administration, in consultation with the Town planning consultant.

Alberta Transportation

Regional Services, Southern Region
Box 314, 909 3 Avenue North
Lethbridge, Alberta T1H 0H5
Telephone: 403-381-5426
Fax: 403-382-4412
www.transportation.alberta.ca

File: 1560-WWP-REDC
Water Treatment Plant Upgrade

RECEIVED
Town of Redcliff
Supervisor: _____
MAY 16 2013
Action: Council / Robo Package.
File # _____

May 13, 2013

Mr. David Wolanski
Municipal Manager
Town of Redcliff
P.O. Box 40
Redcliff, AB T0J 2P0

Dear Mr. Wolanski:

Subject: Alberta Municipal Water/Wastewater Partnership Funding

I am writing with respect to the Water Treatment Plant Upgrade project which is an approved project for the Town of Redcliff under the Alberta Municipal Water/Wastewater Partnership.

Due to recent provincial budget constraints, projects that have not yet been tendered or commenced construction may not receive full funding under the program in the 2013/2014 fiscal year. If you wish to proceed with your project without funding in the current fiscal year, any third party interim financing costs on the unpaid grant from the time of project completion and submission of final documentation to the time of payment of the outstanding grant will be allowed as eligible project expenditures.

Any costs incurred above the approved project cost will still need to be accepted as eligible by the department and will need a separate application to the department for those over-expenditures. Further information on the Alberta Municipal Water/Wastewater Partnership is available on the Internet at www.transportation.alberta.ca/530. If you have any questions or concerns, please call Keith Schenher, Infrastructure Grants Technologist at 403-382-4069.

Yours truly,

Darren Davidson, P.Eng.
Infrastructure Manager

KS/clh

cc: Municipal Programs

Alberta

ALBERTA
TRANSPORTATION

Office of the Minister
MLA, Calgary-Hays

RECEIVED
MAY 21 2013
TOWN OF REDCLIFF

AR58428

May 14, 2013

His Worship Robert Hazelaar
Mayor
Town of Redcliff
P.O. Box 40
Redcliff, AB T0J 2P0

Dear Mayor Hazelaar:

On behalf of the Governments of Canada and Alberta, I appreciate receiving your municipality's submission of the 2013 Application for Program Acceptance (APA) under the Federal Gas Tax Fund (FGTF). The information provided has been reviewed and I am pleased to advise that the project listed on the attached summary is accepted under the terms of the FGTF.

A grant payment in the amount of $284,000 is being electronically transferred to the Town of Redcliff. This amount represents the full amount of the 2012 installment payment under this program.

In the event that any further new projects are proposed for funding under the FGTF, please ensure that an additional APA is submitted to Alberta Transportation's regional office.

This program funding assists Alberta municipalities in addressing their infrastructure needs, and lays the foundation for future environmentally sustainable economic growth across the province.

Government is pleased to partner with you as we work together to address your capital infrastructure needs. Best wishes for success with your project.

Sincerely,

Ric McIver

Ric McIver
Minister

Attachment

425 Legislature Building 10800 - 97 Avenue, Edmonton, Alberta T5K 2B6 Canada Telephone 780-427-2080 Fax 780-422-2722
255, 11488 - 24 Street SE, Calgary, Alberta T2Z 4C9 Canada Telephone 403-215-4380 Fax 403-215-4383

Printed on recycled paper

Alberta Transportation

Action Request Report
58428 - FEDERAL GAS TAX FUND
Acceptance Date:

AR 58428
Date: 03-Apr-2013

Project Location	Phase Name or Limits	Municipal File #	Details and Comments	2013	Total
REDCLIFF					*SOUTHERN REGION*
$1,136,000 Total Program Allocation			Preliminary Estimated Project Cost by Year Subject to Year-End Reporting to Reflect Actual Project Costs		
APPLICATION					
Water Treatment Plant	Water Treatment Plant Upgrades		Upgrade of raw water supply and water treatment plant, to meet new standards and demand for 2013. FGTF component - Supply and installation of 2.1km of 450mm raw water pipeline 1.7km of 150mm treated water pipeline complete with pump station tie-in, associated accessories, road, and parking area construction and site restoration.	$1,108,000	$1,108,000
			Status Subtotals	**$1,108,000**	**$1,108,000**
			Total this application	**$1,108,000**	**$1,108,000**

Preliminary Estimated Project Cost by Year - Subject to Year-End Reporting to Reflect Actual Project Costs

Alberta Transportation

Regional Services, Southern Region
Box 314, 909 3 Avenue North
Lethbridge, Alberta T1H 0H5
Telephone: 403-381-5426
Fax: 403-382-4412
www.transportation.alberta.ca

File: 1560-BMTG-REDC

RECEIVED
MAY 15 2013
TOWN OF REDCLIFF

May 7, 2013

His Worship Robert Hazelaar
Mayor
Town of Redcliff
P.O. Box 40
Redcliff, AB T0J 2P0

Dear Mayor Hazelaar:

Subject: Municipal Grant Payment

Please be advised that a grant in the amount of $305,760 is being electronically transferred to the Town of Redcliff under the 2012 Basic Municipal Transportation Grant.

We look forward to working with your town in continuing to meet your capital infrastructure needs. If you have any questions or concerns regarding this program, please contact Mr. Keith Schenher, Infrastructure Grants Technologist, at 403-382-4069.

Yours truly,

for

Darrell Camplin, P.Eng.
Regional Director

cc: Municipal Programs

Alberta

Wellness Alberta

Box 4500 Station South, Edmonton, AB T6E 6K2
Ph. 780.485.3013 • info@wellnessalberta.ca

Mr Robert Hazelaar
Mayor, Town of Redcliff
Redcliff, AB

May 21, 2013

Dear Health Stakeholder;

RE: Your organization is invited to join *Wellness Alberta*

Wellness Alberta has been created to secure a meaningful government investment in the prevention of chronic disease and injury in Alberta. By bringing together thousands of individuals, business, health and recreational leaders, and supportive organizations, we are raising awareness of this issue and proposing a solution for the benefit all Albertans.

A meaningful investment in wellness

The chronic disease epidemic in Alberta is placing an enormous burden on our quality of life, economy and healthcare system. These diseases - cancer, cardiovascular disease, diabetes, lung disease and mental illness - are largely preventable. Today chronic disease accounts for 90 percent of healthcare costs while only one percent of the total provincial health budget is devoted to the primary prevention of chronic disease and injury.

Through a meaningful investment in prevention and wellness, Albertans will realize improved health outcomes, reduced demands on healthcare, and a better quality of life now and in the future.

Wellness Alberta is recommending the creation of a provincial **Wellness Foundation** that will be well-financed, sustainable and function independently of the healthcare system to maintain financial autonomy, accountability and transparency. Details about the foundation are included with this communication.

Support for a Wellness Foundation is growing quickly and the momentum is building. Over twenty organizations representing hundreds of thousands of Albertans have already endorsed the creation of this foundation. Building on these successes, we are reaching out to many other organizations across Alberta who will support the creation of a Wellness Foundation that is dedicated to disease and injury prevention in our province.

Your opportunity to join the *Wellness Alberta* initiative

Town of Redcliff has been identified by *Wellness Alberta* as an essential stakeholder in enhancing the quality of life of Albertans. We ask your organization to review and sign our *Statement of Support* (attached) for a provincial Wellness Foundation. Please complete the form and return it by fax (780-492-0364) or by email (info@wellnessalberta.ca).

We will ensure that your organization is added to our growing list of supporters. This list will be made public on our website and will be shared in meetings with elected officials and government stakeholders to illustrate the broad base of support that exists for a provincial Wellness Foundation.

If you have questions about *Wellness Alberta* or the proposed Wellness Foundation, please visit our website at www.wellnessalberta.ca or call Vikki Pym at 780-485-3013.

Together we can achieve our goal of establishing a healthier Alberta through the creation of a sustainable and effective provincial Wellness Foundation. Thank you for your efforts to improve the health of Albertans and for your consideration of our request to build on these efforts.

Sincerely,

Dr. Louis Francescutti
Wellness Alberta

Wellness Alberta

Box 4500 Station South, Edmonton, AB T6E 6K2
Ph. 780.485.3013 • info@wellnessalberta.ca

Overview: Wellness Foundation Policy Recommendations

Wellness Alberta is very concerned about the chronic disease epidemic in Alberta. Chronic disease is the leading cause of death and disability in Alberta and it has a major impact on the physical, mental and economic health of all residents. The good news is that over 40% of these diseases can be prevented by taking action to reduce risk factors including tobacco and alcohol use, poor nutrition and physical inactivity.

***Wellness Alberta** Recommends:*

- *Establish a Wellness Foundation to transform the health and quality of life of all Albertans.*
- *The Wellness Foundation must be **well-financed, sustainable** and operate **independent** of the health care system.*
- *The Wellness Foundation must **focus on primary prevention** to address major **modifiable risk factors** for chronic disease.*

Protecting mental health by preventing adverse childhood experiences and reducing risk for injury and disability is also crucial to preventing chronic disease. Unfortunately, the Alberta Government is spending more than ever before on acute health care, with the majority (over 90%) spent on treating and managing preventable disease and disability.

Wellness Alberta believes Alberta needs to make new, long-term and sustainable investments in preventing disease and promoting health to reduce the burden on our health care system and improve our quality of life. Alberta needs a Wellness Foundation.

To maximize the impact on the physical, mental and economic health of Albertans, the Wellness Foundation must be **well-financed**, **sustainable** and **independent** of the health care system. The Foundation will **focus on primary prevention** initiatives to **address six major modifiable risk factors** including physical inactivity, unhealthy eating, tobacco use, alcohol misuse adverse childhood experiences and injury.

- We recommend that the Foundation be announced in August 2013 and initiate operation in April 2014.
- We propose the Foundation be initially financed through an annual grant of $50M, increasing to at least $170M annually (representing an amount equivalent to at least 1% of the Alberta Health budget) over a 3-5 year period.
- The Foundation funding must be new investments that are in addition to Government's current overall investment in prevention and health promotion and must not be reallocated out of existing health budgets.
- New investments can be derived from the Alberta Government's general revenue fund or by the creation of a "Wellness Levy" funded by modest mark-ups on alcohol and tobacco products.
- Stable, long-term funding dedicated to prevention and health promotion is a good value for money: a one dollar investment can be expected to result in a minimum $4-5 cost savings in future acute health care expenditures. However, some large scale interventions have been shown to produce a return-of-investment of up to 50:1.
- The Foundation will ensure new investments are directed to evidence-based strategies and sustained over the long-term to improve the health of Albertans and reduce the burden of chronic disease and disability on our health care system.
- The Foundation must function independently of the acute health care system to maintain financial autonomy, accountability and transparency.
- The Foundation should be created by an Act of the Legislative Assembly and report directly to the Assembly each year.
- The Foundation should be governed by an independent board comprised of key stakeholders that are selected by an all-party committee of the Legislative Assembly.

For more information about what a *Wellness Foundation* could do to promote and protect the wellness of children, adults, families and communities in Alberta, please see our website www.wellnessalberta.ca.

Box 4500 Station South, Edmonton, AB T6E 6K2
Ph. 780.485.3013 • info@wellnessalberta.ca

APRIL 2013

STATEMENT OF SUPPORT FOR A WELLNESS FOUNDATION IN ALBERTA

Wellness Alberta brings together thousands of individuals including business, health and recreational leaders and non-governmental organizations who support a meaningful investment in the prevention of disease and injuries. Through a sustainable investment in an Alberta Wellness Foundation, Albertans will benefit from improved health outcomes and reduced demands on health care, which will greatly enrich the quality of life for current and future generations.

We, the undersigned, support the efforts of *Wellness Alberta* and believe the Alberta Government should establish a *Wellness Foundation* in Alberta, which is:

- ✓ **Well-financed** (initial investment of $50 million annually, increasing over 3 to 5 years to an amount equivalent to at least 1 percent of the health care budget or $170 million annually),
- ✓ **Sustained and protected by legislation,** and
- ✓ **Functions independent of the acute health care system** to maintain financial autonomy, accountability and transparency.

Organization: _____

Name/Title of authorized representative: _____

Email and Phone: _____

We want to receive campaign updates ☐

_____
*Signature

_____
Date

**** Signing this document reflects your endorsement and will be shared on www.wellnessalberta.ca and with public and government stakeholders***

Please sign and return this statement by fax or email to:
Fax: 780-492-0364 or Email: info@wellnessalberta.ca

Municipal Manager's Report
Monday, May 27, 2013

RCMP Lease

The documents have been signed by the Town and now require RCMP signatures. We should get our back payment cheque shortly thereafter.

Vacation

I am scheduled to be away on a vacation in Quebec from June 6-June 11 and will miss the June 10 meetings.

Water Treatment Plant

Meeting is scheduled for May 29th where MPE will present their progress on the design of the new plant. The Committee will provide information following this meeting.

There was discussion regarding an information tour for Council in regards to the Pumphouse site. Administration was trying to coordinate this with MPE's attendance so that they too could provide information and answer any questions. This has been difficult to arrange with Council and MPE's schedules. I would suggest that individual Council members arrange a time with Jamie to discuss and view the progress as it continues to be challenging to arrange a mutually beneficial time.

Municipal Inspection

I was in contact with the inspectors regarding a possible date as I had some vacation scheduled in June and didn't want to conflict with anything. They informed me that the report had been submitted, was going through their internal processes, and that a June presentation was still the most likely timeframe.

Emergency Management

We received 13 excellent proposals from proponents on doing the Hazard, Risk, and Vulnerability Analysis (HRVA). The committee chose MNP as the successful applicant and the work will begin immediately. The RFP for the overall development of the Municipal Emergency Management Plan (MEMP) and Regional Emergency Management Plan (REMP) has been developed and will be posted the week of May 27. All work is expected to be completed within the timeframes and costs secured by the Regional Collaboration Grant with municipal contributions being time only.

Administration is also working on a new draft emergency management bylaw which will align with the Emergency Management Act. The Bylaw and submission to Council on the MEMP and REMP will hopefully be done sometime in the fall which will give us some leeway to ensure its official adoption by the end of 2013.

As outlined in my last report, we hosted an emergency management training exercise on April 29, 2013 with senior staff, Ron Robinson (Director of Emergency Management with the City and Region), and Mark Murphy from Alberta Emergency Management Agency. The purpose of the exercise was to begin the process of detailing Emergency Operations Centre guidelines and Incident Command System (ICS) parameters for staff. This is one step of many that will be done in 2013 so that we make progress in EM initiatives as directed by Council and has always been my desire. Senior staff was also

asked to complete the Basic Emergency Management and ICS 100 courses to which all have been able to accomplish.

Doctor Recruitment

I continue to have some conversations with potential physicians. One particular lead looks very promising as the person's spouse has family in Redcliff and a strong desire to return. He is in his last year of medical school and will begin his residency in the fall. We have agreed to stay in contact over the next few months to establish connections and interest in the community as well as what possible recruitment strategies could be negotiated and discussed with Council.

MGA Review

I attended a Municipal Government Act AUMA zone meeting where issues were discussed related to the review of the MGA that is taking place across the province. Information was forwarded to Council to be discussed at upcoming meetings whereby our comments could be submitted to AUMA who will be lobbying on behalf of municipalities.

The province originally announced that there would be consultation throughout this summer until April 2014. The start has been delayed until November of 2013. The plan was to have a draft MGA by Aug 2014, introduction of bill in spring 2015 and re-introduction/approval of the bill by fall of 2015. There is also supposedly a website being created in late summer by Ministry for the public explaining the process for engagement and comments by public. Once this has been established we will inform our residents about it.

New Fire Department Repeater/Communications

As had been communicated in the past and budgeted for, the Fire Department was working on establishing better communications with the installation of a new repeater on the RCMP Building tower. This has been a lengthy process with approvals being required from the federal communications departments and the RCMP. All the approvals have been granted and the expectation is that the repeater will be installed by the first or second week of June.

Staff/Council golf event

We have already set aside June 21 for our annual staff/council appreciation golf afternoon.

Highway of Heroes

As directed at the last meeting of Council, I was to look into the municipality's ability to approve such a request and discuss it with Municipal neighbours. The City of Medicine Hat was also doing the same thing and had set up a meeting with Alberta Transportation later in June to discuss the issue. I will either be invited or will be provide with the information that they receive regarding this initiative and will follow-up myself and then with Council.

RV Regulations

Administration is working on our analysis and research related to RV regulations. We will be proposing some initial findings and recommendations for suggested changes and public consultation at the June 10 COW meeting.

Finance and Administration

Municipal Tax Notices

Once the Tax Rate Bylaw receives final reading in May, the Finance and Administration will begin the preparation of the tax notices for all property in Redcliff. The notices are scheduled to be mailed May 25th. Tax payments are due June 28th and the final date for assessment complaints will be July 23, 2013.

Indicia Mailing Trial

During the month of May the Finance and Administration department will be testing the indicia mailing system offered by Canada Post. This system allows envelopes to be pre-printed with an account number so that large mailings can be processed online without the added cost of processing with a postage machine. If successful this system will save approximately 5% for all mailings of 100 pieces or more.

GP 2010 Upgrade

The financial software Diamond / GP Dynamics will be upgrade in May. The current version GP 10 is being replaced by GP 2010. Although, updates to this software are completed 2 to 4 times per year, a version upgrade like this one is seen only every 3 to 5 years. There will be very little obvious change as most of the improvements are internal to the software and geared towards the finance department users.

Schedule Items:

May 15th	–	Utility Billing	Bills for water, sewer and garbage service for March and April 2012
May 25th	–	Tax Notices	Estimated mailing for 2013 property tax notices

Public Services

Water and Sewer Utilities

- Staff started the annual flushing of all fire hydrants at the beginning of May. The anticipated completion date is mid-June.
- Staff are also busy with the annual sanitary sewer flushing program. The program involves flushing all sanitary sewer lines on a bi-annual basis.
- Training continues for Evan Dillman who will gradually be taking over additional responsibilities at the Water Treatment Plant.
- The preparation of our Drinking Water Safety Plan continues to be a work in progress and will continue as time permits.

Municipal Works

- Staff completed a storm sewer installation for a new development on Dirkson Dr. NE.
- Street Sweeping has been completed and will now continue on an as need basis throughout the Town.
- Grading and repairs to back alleys has been a priority for staff the past few weeks and will continue for several more weeks until completed.
- The replacement of a significant number of garbage bin lids has been delayed this spring as we awaited the arrival of a shipment of new replacement lids. The bins have now arrived and we will be scheduling the replacement as soon as possible.

Parks and Recreation

- Parks staff is currently working in their busiest time of the year preparing all of our parks and recreation facilities for another season.
- Repairs to the Water Park as scheduled and budgeted are nearing completion. The water park will open later this month, weather permitting.
- We have received the new “Trackless” Utility Vehicle and the new skid steer loader as approved for purchase in the 2013 budget.
- The vast majority of the upgrade to the Aquatic Centre has been completed. Watson Pools will be returning on May 21 to complete their work and commission the pool for the 2013 season.
- Kevin Parkinson has recently been hired to fill the vacant Facility Operator position.
- Quotes were obtained for the heaters at the Rec-Tangle and the lowest proponent (within budget) has been chosen with work expected to begin shortly.
- The long awaited Columbarium for the cemetery has arrived and will be installed on May 24.
- Quotes were received for the outdoor rink and will be reviewed before choosing the successful proponent. Including the concrete work, the budget appears to have been met.
- There have been a few calls regarding fences in Riverview needing repairs. If you recall, Council discussed this a number of months back and looked at the restrictive covenant which identified the property owners being responsible. Council advised to proceed as such. This has been communicated but we wanted to bring it to Council’s attention in case there were any concerns raised.

Landfill

- Staff continue to experience a busy spring at the landfill while meeting average volumes for waste delivered to the landfill.
- It has been necessary to restrict certain deliveries to the landfill during specific times on several occasions this past month due to wind conditions.
- A total of 68 Redcliff residents took advantage of the free tipping fees at the landfill during Pitch- In Week of April 22 to 27.

Community Services

The Community Services Program Guide for May 1 – August 31 was sent out. We have gardening; employment and parenting programs arranged and need to confirm details yet for some fitness, youth and art programs.

Preparations continue for Redcliff Days and Canada Day. The Pool staff has been preparing for the season with a weather permitting opening of June 1. Registrations for swim lesson's is scheduled for June 5/6.

Engineering

Eastside Phase 1 Parks & Landscape

- Contract documents has been prepared and sent to Grass Root Landscaping for his signature and once documents are returned Town will sign off.
- No project kick-off date has been scheduled by the Grass-Root Landscaping

Sanitary Systems Evaluation Study

- MPE has completed the final report and will be brought forward for Council/Committee in future meetings

Water Treatment Plant, Raw water pump station and pipeline upgrades

- Pump Station Upgrade:
  - Carver Constructions Ltd (CCL) has installed the generator in the controls building and MCC panels installation in progress
  - Roof demo at old pump station building, mechanical and electrical components removal in progress
  - CCL is setting up the temporary pumping system installation in progress. All property owners currently on raw water service have been informed and notices will be sent out in advance of any scheduled disruption of raw water service.
  - Next bi-weekly pump station site meetings scheduled for May 15th and May 29, 2013
- Rawwater pipe line and Water Treatment Plant :
  - Raw water line contract documents reviewed and returned to MPE after signing from Town authorities.
  - Town is waiting to hear about L.W.Dennis start-up meeting and Schedule of work.
  - Water Treatment Plant Design Review meeting is scheduled for May 29, 2013.

2013 Capital Projects:

- Detailed design in progress for Old TransCanada Highway Rehab including NW seasonal lift station, Margaret Wooding School laneway drainage design, 3rd St SE (1st Ave to Mid 200 block), Isolated Road Repairs including South Highway Drive drainage improvement, various fire hydrant and water valve replacement and line painting in progress.
- Geotechnical final reports received from Genivar for Old TransCanada Highway Rehabilitation and 3rd St SE (1 Ave to Mid 200 block). Geotechnical recommendations will be incorporated in the design.
- Geotechnical testing on South Highway Drive in progress.

- Broadway Ave E – Stantec did the original design. Detailed design update through Stantec in progress.
- Town has planned to tender all above projects in the week of May 20th.

Other Miscellaneous.

- Review and commented on access plan from Redhat.
- Drawing preparation for operating projects- Road line painting and misc water valve and fire hydrant replacements in progress.
- GIS data base construction using ArcGIS 10 is in progress and incorporating landuse information.
- Review of BMX track safety problems in progress.

Legislative and Land Services

- Ongoing inquires re: land sales, development & subdivision. Increased number of inquiries relating to the Eastside lots.
- Ongoing enforcement issues of non-permitted development (ie. Signs) and older files.
- Recent development permit activity includes an application for Highway Commercial valued at $800,000, a Horticultural application valued at 1.2 Million, a single family dwelling and several other more minor applications (ie: accessory buildings, decks etc.)
- The Red Hat Cooperative has submitted a new development application for their entrance on Mitchell Street. The Manager of Engineering, the Development Officer, Manager of Legislative & Land Services has met with Red Hat representatives to discuss Town concerns.
- The owner of 22 – 2nd St. SE has approached the Town again inquiring about utilities on their lot and resolution thereof. I have contacted City of Medicine Hat Electric Department, Telus and Shaw to inquire.
- Documentation relating to the Utility Right of Way Agreement and Temporary Work Space Agreement for the Raw Water Pipeline Upgrade Project was rejected by Land Titles. The parties affected have been contacted. Documentation is in the process of being resigned and will be resubmitted was received.
- Board Vacancies: Subdivision and Development Appeal Board, Family & Community Services Board, Recreation Services Board, Redcliff Public Library.
- Police False Alarms – No fines issued to date.
- Completed the Assessment Review Board Clerk Refresher course, the Basic Emergency Management and Incident Command System course, and my final course for the ALUP program.

Mayor and Councillor Reports
Monday, May 27, 2013

NOTE: As per Council resolution, the Mayor and Council members will submit a report monthly to Council as to some of their activities. The general guideline is that reports will be submitted based on events attended outside of their normal Committee responsibilities. The rationale behind this guideline is that normal Committee responsibilities or meetings (i.e. Library board(s), Rec. Board, FCSS, Economic Development Agencies, etc.) provide minutes to Council on a regular basis. This guideline does not preclude Council members from providing information on those Committee or other activities should the member of Council deem it important to the rest of Council based on significance, timing of the information, or other factors. Seeing "nothing to report" from various Council members in monthly reports does NOT mean that they aren't performing critical Council committee responsibilities.

Mayor Rob Hazelaar

- Attended and participated in "Leaders of Tomorrow" presentation at Medicine Hat City Hall.
- Attended events to recognize the Lions Club contribution to several Town projects as well as the Medicine Hat Kinsmen support of Public Skating/Swimming.
- Attended and said a few words on behalf of the Town/Council for the walk recognizing mental health week that was done by Prairie Rose DREAMS coordinator and had participation from all three Redcliff schools.

Councillor Chere Brown

Assessment Review Board Refresher course, May 1 & 2, Lethbridge

- have to refresh this training every 3 years
- some provincial assesment members at this session & they talked about their experiences in large centers
- approx. 65% of all appeals in the province are in calgary
- 75 question exam at the end of this course

Redcliff Youth Center meeting, May 6

- new President elected, Noreen Forsyth
- doing major kitchen renos for center, funding from grants
- casino, Sept. 18&19, can anyone help, contact center

Chamber Coalition meeting, May 16

- approx. 25 people attended
- team Lethbridge model
- any stakeholders still to contact, energy sector, horticulture, agriculture & tourism
- levels, local-MLA-Government
- local group meetings held quarterly
- meetings with government held yearly at a minimum
- city expressed issues with this being another group they fund
- chamber will chair this for now, with various people stepping forward to help with an executive board
- city was well represented with the mayor, 2 alderman & 2 staff

Councillor Cathy Crozier

Nothing to report at this time

Councillor Dwight Kilpatrick

Nothing to report at this time

Councillor Ernie Reimer

Attended AUMA MGA review consultation session in Brooks May 15.

Councillor Eric Solberg

Nothing to report at this time

Councillor Jim Steinke

Attended ARB refresher course in Lethbridge May ½.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION

(Project Number: 3400-003-00)

MPE Engineering Ltd.

May 2013

#40, 1825 Bomford Crescent SW
Medicine Hat, Alberta T1A 5E8
Phone: (403) 548 - 2626
1- 800 - 351 - 0926
Fax: (403) 548 - 7773

Town of Redcliff
Box 40, #1 – 3rd Street NE
Redcliff, Alberta T0J 2P0

May 6, 2013
File: 3400\003\00\R01

Attention: Khalil Minhas, P.Eng.
Manager of Engineering

Dear Mr. Minhas:

Re: Wastewater System Evaluation
Final Report

We are pleased to submit six hard copies and one electronic copy of the above noted study. We thank you for the opportunity to be of service and to have prepared this report on your behalf. We look forward to assisting you in implementing your plans for the future. If you have any inquiries regarding our report or if clarification is required, please contact the undersigned.

Yours truly,

MPE ENGINEERING LTD.

Patrick Boyd, P.Eng.
Design Engineer

PB:pb

Enclosure

CORPORATE AUTHORIZATION

This report has been prepared by MPE Engineering Ltd. under authorization of the Town of Redcliff. The material in this report represents the best judgment of MPE Engineering Ltd. given the available information. Any use that a third party makes of this report, or reliance on or decisions made based upon it is the responsibility of the third party. MPE Engineering Ltd. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based upon this report.

Should any questions arise regarding content of this report, please contact the undersigned.

MPE ENGINEERING LTD.

ORIGINAL
SEALED BY
PATRICK N. BOYD
2013-05-07

Patrick Boyd, P.Eng.

Professional Seal

Corporate Permit

0.0 EXECUTIVE SUMMARY

The Town of Redcliff retained MPE Engineering Ltd. to conduct an evaluation of their wastewater collection system. The purpose of the evaluation is to identify deficiencies, identify capacity constraints, and to provide a priority list of improvement projects to meet current and future development.

0.1 Study Background

The existing wastewater collection system serves approximately 5,588 people in a total area of 1,667 hectares. The Town's existing wastewater system consists of gravity mains and forcemains with associated lift stations, which ultimately lead to the City of Medicine Hat's wastewater treatment facility through a sanitary gate located at the southeast end of the Town's boundary. The Town and City of Medicine Hat are in discussions to explore existing sanitary gate capacity issues, which include upgrade plans and building a second sanitary gate on the north side of Town to meet the demands of existing and future developments in the Town and City. During periods of wet weather, the City's flow meter at the sanitary gate measures substantial flow spikes suggesting significant inflow/infiltration (I/I) problems in the Town's wastewater collection system.

0.2 Flow Monitoring Program

SFE Global (SFE) was retained by the Town to provide sanitary sewer flow monitoring from May 16, 2012 to August 14, 2012 using three monitoring stations and a rain gauge. Each of the three stations was moved once during this period to provide a total of six different sites throughout the Town. The City of Medicine Hat also provided their flow monitoring data measured by their flow meter at the sanitary gate.

Based on the flow monitoring data, we found the following areas of concern:

- The South Trunk observes wet weather flow rates eight times the average flows suggesting significant I/I into this trunk system. It is recommended to further conduct I/I investigations (smoke testing and dye testing programs) to narrow down the sources of I/I and to review the possibility of disconnecting known sump pumps and roof drains from the wastewater system or installing dedicated stormwater collection systems in these older areas.
- The NW area has been known to surcharge the 3rd Avenue NW lift station during wet weather. Additional flow monitoring programs should be setup upstream of the lift station to further quantify the actual dry and wet weather flows in the NW area. The flow monitoring should be

concentrated on the main system that collects the most greenhouses as greenhouses have been an undetermined source of significant I/I.

In general, further flow monitoring programs are recommended to help narrow down the areas of high I/I within these trunk systems followed by smoke and dye testing programs.

The North Industrial Trunk system sees low average, peak dry, and peak wet weather flows for an area of this size. This may be as a result of the current density and type of businesses in the area.

0.3 Existing Wastewater System Condition

20% of the Town's wastewater collection system is greater than 50 years old, and 26% is between 40 and 50 years old. It is anticipated that most of the older areas with VCT pipe will require replacement within the next 5 to 20 years. It is recommended that the Town develop a replacement program for VCT pipe which will be based on age, condition, and any other work needing to be done in the same area such as water main replacement or road rehabilitation programs.

CCTV inspections were performed on 1,750 meters of mains to assess the physical condition of the system and to look for instances of I/I. Very few actual sources of I/I were witnessed; however, several sources of likely I/I points were identified based on the condition of the pipe.

MPE surveyed the rims and inverts of Town selected manholes to confirm and update the Town's MIMS/GIS system.

0.4 Existing Wastewater System Capacity Assessment

A hydraulic model of the Town's wastewater collection system was developed and calibrated to the actual measured wastewater flows and development areas. From this calibrated model, five areas of the Town's collection system show existing capacity issues, including the entire South Trunk along 9th Avenue to the sanitary gate. The South Trunk is undersized and no further development should be connected to this trunk system until upgrades are complete or I/I is significantly reduced. It is recommended that actions begin immediately to begin preliminary engineering work, detailed design and replacement of these areas.

0.5 Future System Evaluation

The Town's Municipal Development Plan (2010) identified areas for future development. These areas are called Eastside, Northside, North Gateway, Northend, Westend, Bayliss and River Terrace. A growth rate of 2.5% is assumed. Future wastewater flows were generated using the recommended parameters developed in this report based on a balance of the calibrated flow data and accepted industry standards. The future generated flows were inputted into the wastewater model.

0.6 Summary of Recommended Upgrades (Immediate to Short Term – 5 years)

The studies should begin immediately followed by implementation of the required upgrades.

Immediate to Short Term Upgrades		
Upgrade	**Conceptual Cost**	**Priority**
Upgrade South Trunk from 1st Street SW to sanitary gate (20th Street SE). The design and study will take in the order of 1 to 2 years and should be initiated immediately.	$7,515,000	HIGH
Discuss and finalize future Town servicing options with the City of Medicine Hat which includes the 2nd sanitary gate option and upgrades to the City trunk east of the Town.	N/A	HIGH
Conduct further testing on 3rd Avenue NW lift station to diagnose the poor flow output as current measured output does not meet ESRD Guidelines to pump peak wet weather flows.	N/A	HIGH
Develop a I/I reduction strategy, which will include additional flow monitoring and possibly other tests such as smoke or dye tests, to narrow down the areas of high I/I. Review options for reducing I/I and develop an implementation plan concentrating on the NW area upstream of the lift station and other various areas of the South Trunk system.	$100,000	HIGH
Confirm capacity constraints in the locations listed below. Work will generally include survey (by rod and level) and verification of pipe diameter to confirm capacity. Carry out upgrades on sections that are confirmed to be under capacity.		
• Area 1 – 3rd Avenue NW from 4th Street NW to 5th Street NW	$289,000	LOW
• Area 2 – Broadfoot Place SW to Main Street	$576,000	MEDIUM
• Area 3 – 1st Street SEt from Broadway Avenue to 9th Ave SE	$1,763,000	MEDIUM
• Area 4 - 2nd Street SE from 6th Ave SE to 9th Ave SE	$971,000	MEDIUM

Develop a VCT pipe replacement program to prioritize replacement of VCT pipe. Commence replacement of VCT pipe in order of priority.	$50,000 (For study)	MEDIUM
Consider development of an Infrastructure Master Plan (IMP) to help the Town prioritize upgrades by taking other utilities and roads into account.	$125,000	MEDIUM
Consider installing a magnetic flow meter on the 3rd Ave NW lift station to monitor flow in this area, which seems to have high I/I flows.	$20,000	LOW
Consider installing a magnetic flow meter on the Jesmond lift station to monitor flow in this area, which seems to have high I/I flows.	$20,000	LOW
Install phone service to Redcliff Way lift station with auto-dialer.	$10,000	LOW
Consider upgrades to the wetwell of Redcliff Way lift station to install the header pipes and valves inside the wetwell to avoid freezing.	$200,000	LOW
Install a stable grab bar and proper pump lifting davit on Redcliff Way lift station.	$20,000	LOW
Conduct further testing on Factory Lift Station and Redcliff Way Lift Station to diagnose the lower flow output than the design duty points. These lift stations are within ESRD capacity guidelines but they do not discharge at the Xylem provided pump duty points.	N/A	LOW
TOTAL	$11,659,000	

0.7 Summary of Recommended Upgrades (Long Term)

It is anticipated that ultimate build-out of the all the future areas in this report will take approximately 40 years. The FSR's for these areas should contain a staging plan for the development of new infrastructure and required upgrades to existing infrastructure. For the purpose of this study, it is assumed that the following upgrades will be long term (greater than 20 years).

Long Term Upgrades	
Upgrade	**Conceptual Cost**
Once North Industrial servicing options are finalized with the City, build a 2nd sanitary gate or upgrade the existing North Trunk system to the existing sanitary gate.	$4,808,000
Upgrade sections of existing mains in the Northwest area to accommodate future development.	$3,120,000
Upgrade the 3rd Avenue NW lift station as development progresses.	$900,000
Upgrade Jesmond lift station as Bayliss development progresses.	$650,000
Continue VCT replacement program	N/A
Continue I/I reduction strategy	N/A
TOTAL	$9,478,000

0.8 Conceptual Cost Estimates

Conceptual cost estimates to remove and replace 200mm sanitary sewer mains including road rehabilitation are summarized below. The cost estimates are for local residential, collector and undivided major roadway classifications.

Conceptual Cost Estimates	
Road Classification	**Conceptual Cost ($/meter)**
Local Residential (10.5 m wide)	$3,700
Collector (12 m wide)	$4,000
Undivided Major (14.8 m wide)	$4,600

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1.0 INTRODUCTION

The Town of Redcliff retained MPE Engineering Ltd. to conduct an evaluation of their wastewater collection system. The purpose of the evaluation is to identify deficiencies, identify capacity constraints and to provide a priority list of improvement projects to meet current and future development.

1.1 Scope of Work

The focus of this study is to review the general condition and capacity of the Town's sanitary sewer system. The major tasks included in this project are as follows:

- Review the historical information, various area structure plans (ASP), functional servicing reports (FSR), Town policies and procedures, and other related documents.
- Collect missing survey information for MIMS and create system inventories.
- Provide inventory and condition assessment of each lift station within Town limits and determine if the capacity of each lift station meets Alberta Environment and Sustainable Resource Development's (ESRD) standards.
- Flow monitoring interpretation and analysis of Town provided flow data to estimate realistic sewage generation for the Town.
- Create a Town-wide sanitary system model in Microsoft Excel format to include projections for existing and future developments in intermediate and full build scenarios.
- Analyse the Town's sanitary system in terms of capacity constraints (bottle neck) and level of service issues and the impact on single gate and dual gate options to determine the most cost effective upgrades for future servicing.
- Review CCTV inspections of Town provided videos for inflow and infiltration issues.
- Prepare conceptual level upgrade plans identifying the sewer sections and associated structures requiring immediate, short term (5 years) and long term (15 to 20 years) upgrades.
- Prepare a priority list of the upgrades complete with conceptual cost estimates.

1.2 Background

The Town of Redcliff is located on the north and east banks of the South Saskatchewan River immediately west of the City of Medicine Hat and approximately 300 km east of Calgary (see Figure 1 located in Appendix A). Statistics Canada 2011 Census indicates a population of 5,588 people. The Town has a total area of 1,667 hectares which includes 601 hectares of recently annexed land from Cypress County for future development. The Town is divided into two parts by the Trans-Canada Highway 1. The Town's land north of Highway 1 consists of industrial, horticultural, and commercial use and the land to the south of Highway 1 consists of a mix of residential, commercial and horticulture use.

The Town's wastewater system consists of gravity mains and forcemains with associated lift stations, which ultimately lead to the City of Medicine Hat's wastewater treatment facility through a sanitary gate located at the southeast end of the Town's boundary. The City of Medicine Hat has sewage flow monitoring equipment (a magnetic flow meter) installed at the existing sanitary gate.

Since early 2011 the Town has had discussions with the City of Medicine Hat to explore existing sanitary gate capacity issues, upgrade plans, or a possible new sanitary gate on the north side of Town to meet the demands of existing and future developments in the Town and City. From these discussions and the available data, the City has commented that the ultimate flow projections for the Town would require substantial capacity upgrades to the City's system. The associated cost of these upgrades would be borne by the Town and the City. The City has expressed concerns about what they consider excessive flow spikes at the sanitary gate during wet weather events. The City has shown the Town sewage flow measurements taken at the existing sanitary gate which indicate excessive wet weather peak flows. These peak flows create a surcharge in the City's system. The City asked the Town to investigate the occurrence of extraneous inflow during snow melts and rainy weather. Town staff visually inspected the sanitary system trunk mains within the Town's limits to identify possible sources of inflow and infiltration, but no sources contributing to wet-weather flow spiking could be found. The Town has historically experienced sewer back up issues in the South Trunk main (two occurrences noted in the past).

1.3 Data Collection and Review

The following data was collected and reviewed during the data collection task. Included with each reference are notes of the key information used from each source.

- Relevant reports and studies:
    - "Preliminary Report on Sewage Treatment and Disposal" By Reid, Crowther and Partners Ltd. (November 2, 1973).

      Key Information: Design population of Redcliff used to design the existing gate system was 5,000 people at 120 gallons per capita per day (454 litres per capita per day). Note: the current Town's population has exceeded the design population for the City's gate trunk system.
    - Copy of the agreement on sanitary systems between the Town and City of Medicine Hat (June 5, 1974).

      Key Information: This is the agreement between the City of Medicine Hat and the Town of Redcliff describing that the City will treat the Town's sewage.
    - Background Information – "Diary of Events on Sanitary System" By R. Giesbrecht (February 6, 1997).

      Key Information: Summarizes changes to the sanitary system agreement between the Town and the City up to 1997. Most of the diary is related to sewage treatment rate changes.
    - "West Side Area Structure Plan" By Dr. G. De Vries, P. Eng. (April, 2003).

      Key Information: West Side is an expansion of residential zones containing a total area of 33.57 hectares of which 17.50 hectares is developable. West Side is broken into two stages: West Side North (5.5 ha) and West Side South (12.0 ha). West Side North to have 55 residential units. West Side South to have 87 residential units. The south is already developed.
    - "Eastside Area Structure Plan" By Dr. G. De Vries, P. Eng. (October, 2001).

      Key Information: Eastside is an expansion of residential and commercial zones containing a total area of 225.93 hectares of which 173.72 hectares is developable.

- "Eastside Functional Servicing Report" By Stantec Consulting Ltd. (November 2006)

  Key Information: The design peak sewage generation for the Eastside area was calculated to 180 l/s based on approximately 143.0 hectares of future residential and 33.5 hectares of future commercial development as detailed in the report.

  The report identified capacity constraints in the 375 mm trunk to the City. Section 5.4 of the FSR reads: "Discussions with Town staff indicate that the existing flows from the Town of Redcliff cause surcharging under higher flow conditions (likely during wet weather), which leads to the conclusion that additional capacity is required to service the Eastside development." The report recommended twinning the existing 375 mm trunk main to the City with a 600 mm main from Mitchell Avenue to the City of Medicine Hat collection system.
- "Northside Area Structure Plan" By Scheffer Andrew Ltd. (October 13, 2009).

  Key Information: Northside is an expansion of industrial zones containing a total area of 163 hectares of which 125 ha is developable (115 ha industrial, 10 ha commercial).
- Email and Letter: "Sanitary Sewer for Northside Area" By Scheffer Andrew Ltd. (January 13, 2011).

  Key Information: Twelve sanitary servicing design options discussed. The Town's preferred option was Option 8C-2. The developable area increased from the Northside Area Structure Plan to accommodate the Town's new annexed lands to the north.

  For this report, measured flow data was used to calibrate actual sewage generation rates for the Town. The 375 mm trunk to the City was identified to surcharge during wet weather flows with peak flows spiking 7.5 times larger than average flows. Low inflow / infiltration rates were observed for the existing North Industrial area. Estimated ultimate build-out flows for the Town were 847.5 l/s to the City gate.
- "Northwest Area Storm Water Investigation" by EXH Engineering Services Ltd. (January 29, 2004).

  Key Information: A study commissioned by the Town to identify the sources of peak wet weather peak sewage flows in the NW area that was witnessed by the lift station. The study found that "sanitary sewer flow volumes contain a significant storm water component" and "horticultural operations as a whole result in a significant contribution

to the sanitary sewer flow values." No conclusive evidence was found in the report to explain the peak wet weather flows in the NW.

- "Tri Area Intermunicipal Development Plan 2010" by Cypress County, Town of Redcliff and City of Medicine Hat. (July 20, 2010).

  Key Information: The plan is a joint development by the three municipalities to improve consistency in land development and enhance inter-municipal efficiency and communication. The plan covers a broad area and a general direction for development between the municipalities.

- "Town of Redcliff Municipal Development Plan" by Scheffer Andrew Ltd. (June 14, 2010)

  Key Information: The plan establishes the future directions for growth in Redcliff:

  Eastside – Primary future residential growth and future commercial development area.

  Northside – Primary future industrial growth area.

  North Gateway – Future commercial / highway commercial growth area.

  Northend – Continue existing development with a mix of residential, horticultural and industrial. Development expected to grow with primarily residential areas.

  Bayliss – Continue to develop with a mix of horticultural, commercial and light industrial land uses.

  Westend – Secondary future residential growth area.

  River Terrace – future low density estate residential area due to location on the river plain and site constraints.

- Standards and Guidelines:
  - "Town of Redcliff Design Guidelines and Construction Standards" By Town of Redcliff (January 2009)
  - "City of Medicine Hat Municipal Servicing Standards Manual" By City of Medicine Hat
  - "Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems" published by Alberta Environment and Sustainable Resource Development (ESRD), (January 2006)
  - "City of Lethbridge WW Generation Standards" by City of Lethbridge (2006)
- Flow Monitoring Data:
  - Town of Redcliff Flowlink data for approximately one month in 2007.

- "Sanitary Sewer Flow Monitoring Rainfall Monitoring 2012" by SFE Global (October 29, 2012)
- City of Medicine Hat flow data at the City gate for May 15, 2012 – August 15, 2012 provided by the City of Medicine Hat Environmental Utilities Department.

- 2011 census data from Statistics Canada website (www.statscan.gc.ca)
- "CCTV Inspection Videos and Reports" By Sanatec Environmental (November 2012)
- Xylem (Flygt) pump curves for each lift station. Email dated September 9, 2012
- Town of Redcliff GIS files and databases including utility system layers, land use zoning layers, legal parcel mapping, digital aerials, and future land use mapping, etc. Geographical Information System (GIS) databases and base mapping provided by the Town were used to setup the sanitary model and display the results for visual presentation.

1.4 General Inflow / Infiltration

Sewage generation rates are classified into dry weather flows (DWF) and wet weather flows (WWF). DWF are flows generated during periods of no precipitation (rain events or snow melt) and are composed of base sewage flows into the system. WWF is the direct result of precipitation (rain events or snow melt) affecting the wastewater collection system by inflow and infiltration (I/I).

Inflow is the rapid response to rainfall as water directly enters the system through manhole lids, cross connections from storm sewers and catch basins, weeping tile connections, roof drains and downspouts, sump pumps, etc.

Infiltration is a slower response to a rainfall event where rain water seeps through the ground and enters the system through cracked pipe and/or manholes which may be caused by age-related deterioration, tree roots, loose joints, damage, etc.

In general, most I/I in towns and cities originate from older neighbourhoods where weeping tile is connected directly to the sanitary system, downspouts are connected to the weeping tile, and where lot grading does not always provide positive drainage away from building foundation. Basement sump pumps are common in some residential areas and are known to connect directly to weeping tile systems or to sanitary service laterals which connect directly to the wastewater sewer system.

If extraneous flows can be reduced, capacity on the system is effectively freed up to allow more growth. This means that as the population grows, the system is able to accommodate the flows. Significant capital expenditures to upgrade the wastewater system can be deferred or avoided by reducing extraneous flows. Capacity that is not needed to convey and treat wet weather flows can be utilized for normal sanitary base flows. In addition to capacity issues, excessive I/I can lead to sewer backups into basements causing health concerns and property damage. Sewage overflows in manholes and lift stations risk contaminating the environment by spilling onto property and into storm sewer systems which can outfall and contaminate land, streams and rivers.

Following are general examples of techniques used for inflow and infiltration reduction and control. These are concepts only at this stage for discussions purposes. Further feasibility studies can be undertaken to determine feasibility and estimated costs.

- Replacing or rehabilitating the defective sewer pipe, laterals, and/or manholes.
- Pipe grouting/sealing – using a cement-based or other material to fill a hole or crack in a pipe or manhole.
- Pipe lining – inserting a CIPP liner into defective sewer pipes or service laterals which hardens into an impervious surface.
- Manhole cover liners for known sag manholes to reduce direct inflow through the cover.
- Disconnecting known inflow sources, such as cross-connected catch basin drains, foundation weeping tile connections, basement sump pump connections, roof drains, or downspouts.
- Install storm water collection systems in areas where none currently exist.
- Storage tanks to capture peak wet weather flows and release at a controlled rate.

Following are suggested methods to detect I/I:

- Flow monitoring and rain gauges – flow rates are monitored at various locations within the wastewater collection system. The flow data is analyzed and compared to rainfall data. Flow rates that increase significantly during rainfall indicate the area has an I/I problem.
- Smoke Testing – a non-toxic, non-staining “smoke” is injected, under pressure, into a wastewater manhole. Smoke escaping the ground in locations other than the wastewater system, such as a downspout indicates a source of I/I.
- Dye Testing - non-toxic dye is added to a suspected upstream stormwater source. The

downstream wastewater system is then monitored for trace of the dye. Traces of dye would confirm a source of I/I.

- Closed Circuit Television Inspections (CCTV) **-** a video camera is sent through the wastewater connection to record the condition of the pipe. The video footage is analyzed for cracks, root intrusions, leaks and stormwater connections.

2.0 EXISTING WASTEWATER COLLECTION SYSTEM

The Town's wastewater system consists of gravity mains and forcemains with five pump stations which ultimately lead to the City of Medicine Hat's wastewater treatment facility through a sanitary gate located at the southeast end of the Town's boundary. Refer to Figure 2A and 2B for overall layout of Town's wastewater system.

The Town's Wastewater collection can be broken down into three trunk systems that lead to the Town's sanitary gate as shown in Figure 3. The three trunk systems are:

- South Trunk – consisting mostly of residential (182.1 ha) with commercial (7.53 ha) and horticultural (4.54 ha) areas.
- Northwest Trunk - consisting mostly of horticultural (25.99 ha) with residential (19.9 ha), industrial (16.11 ha) and commercial (13.47 ha) areas.
- North Industrial Trunk - consisting mostly of industrial (100.2 ha) with commercial (21.2 ha) and horticultural (8.59 ha) areas.

The areas above are based on total developed areas that generate sewage flows. The areas do not include streets, parks, or any other non-developed areas that don't contribute to sewage flows.

In most of the older parts of the Town, the sewer pipe is vitrified clay tile (VCT) and in newer developments, the pipe is polyvinyl chloride (PVC). Existing pipe material types are shown in Figure 4A and Figure 4B and pipe age by decade is shown in Figure 5A and Figure 5B. Table 1 and Table 2 show a summary of pipe diameter, material, and total length of pipe in the Town's wastewater system.

Service life of VCT pipes is generally about 50 years. 20% of the mains in Town are greater than 50 years old, 26% are between 40 and 50 years old and 21% are between 30 and 40 years old. It is anticipated that most of the areas with VCT pipe will require replacement within the next 5-20 years. It is recommended the Town develop a replacement program for VCT pipe based on age, condition, and any other work needing to be done in the same area such as water main replacements or road rehabilitation programs. An infrastructure master plan (IMP) can be developed for the Town that would review the Town's infrastructure (roads, sidewalks, sewers, water etc.) and create a list of replacement/upgrade priorities.

Table 1: Pipe Diameter and Material	
Pipe Size (mm) and Material	**Length (m)**
200 VCT	19,185
200 PVC	13,293
TOTAL	**32,478**
250 VCT	2,711
250 PVC	2,474
TOTAL	**5,185**
300 VCT	2,897
300 PVC	336
TOTAL	**3,233**
375 VCT	1,669
375 PVC	644
TOTAL	**2,312**
450 VCT	315
450 PVC	3,204
TOTAL	**3,520**
525 PVC	255
750 PVC	626
Forcemains	
75 PVC	543
150 HDPE	222
150 PVC	911
250 PVC	1,215
TOTAL PIPE	**50,500**

Table 2: Pipe Material	
Pipe Size (mm) and Material	**Length (m)**
VCT	26,778
PVC	23,500
HDPE	222
TOTAL	**50,500**

Table 3: Pipe Age		
Year Installed	**Pipe Size (mm) and Material**	**Length (m)**
1949 -1959	200 VCT	6,550
	250 VCT	1,534
	300 VCT	312
	TOTAL	**8,396**
1960 - 1969	200 VCT	754
	TOTAL	**754**
1970 - 1979	200 VCT	7,575
	200 PVC	120
	250 VCT	1,177
	300 VCT	1,484
	300 PVC	336
	375 VCT	1,669
	375 PVC	121
	450 PVC	120
	TOTAL	**12,600**
1980 - 1989	200 VCT	3,960
	200 PVC	2,942
	250 PVC	781
	300 VCT	1,089
	450 VCT	315
	450 PVC	941
	TOTAL	**10,027**
1990 - 1999	75 PVC	543
	150 PVC	246
	200 VCT	345
	200 PVC	5,048
	300 VCT	13
	450 PVC	632
	TOTAL	**6,827**
2000 - Present	150 HDPE	222
	150 PVC	665
	200 PVC	5,185
	250 PVC	2,908
	375 PVC	523
	450 PVC	1,512
	525 PVC	255
	750 PVC	626
	TOTAL	**11,896**
	Total Pipe	**50,500**

2.1 Flow Monitoring

SFE Global (SFE) was retained by the Town to provide sanitary sewer flow monitoring from May 15, 2012 to August 14, 2012 using three monitoring stations and a rain gauge used to monitor rainfall during flow monitoring. Each of the three stations was moved once during this period to provide a total of six different sites throughout the Town. Refer to Figure 6 and Table 4 for SFE flow monitoring sites.

In addition to the SFE Global flow monitoring program, the City of Medicine Hat provided flow data collected from their flow meter at the sanitary gate for the same time period as the SFE study. This data was analysed in detail. The City also provided flow data from 2010 to 2011 at the sanitary gate. The 2010/2011 data was reviewed only to verify consistency with the 2012 data but not analysed in detail as it was outside the scope of this project.

Table 4: SFE Flow Monitoring Sites

SFE Site Number	SFE Site Number (Shortened)	Manhole Number	Trunk System	Install / Removal Date	Physical Street Address
A12-121-01	A01	E88A	Northwest	May 16, 2012 / June 18, 2012	1001 Broadway Ave NE
A12-121-01a	A01a	DA03	South	June 18, 2012 / August 13, 2012	20th Street South
A12-121-02*		D965	South	May 16, 2012 / May 25, 2012	519 Main Street
A12-121-02 Weir	A02	D965	South	May 25, 2012 / June 18, 2012	519 Main Street
A-121-02a	A02a	D8C4	South	June 18, 2012 / August 14, 2012	1st St. & 8th Ave.
A12-121-03*		D8E7	South	May 16, 2012 / May 25, 2012	664 2nd Street
a12-121-03 Weir	A03	D8E7	South	May 25, 2012 / June 18, 2012	664 2nd Street
A12-121-03a	A03a	15216	North	July 4, 2012 / August 13, 2012	Saamis Dr. & 20th St.
A12-121-RG1 (Rain Gauge)		N/A	N/A	May 16, 2012 / August 14, 2012	Town's Public Works Building

* Data collected prior to weir installation not usable (no accuracy)

The flow data was processed distinguishing dry days and wet days. A dry day is defined as having no precipitation for at least 12 hours prior. A wet day had some amount of precipitation measured by the SFE rain gauge which was located on the Town's Public Works building. A minimum, maximum, and average flow rate was calculated for dry days from the data at each flow monitoring station (refer to Table 5). Table 5 also shows the maximum peak wet weather flow measured during the monitoring period, and the resulting peak factor.

Table 5: Summary of Measured Flows - May 16, 2012 to August 14, 2012								
		City Gate	**North-west Trunk**	**South Trunk**	**North Industrial Trunk**	**Manhole D965**	**Manhole D8C4**	**Manhole D8E7**
	SFE Site Number		A01	A01a	A03a	A02	A02a	A03
DRY DAYS	Avg. Min Flow (l/s)	**12.59**	0.54	8.57	5.27	2.02	1.30	0.25
	Average Flow (l/s)	**29.08**	7.85	16.90	8.00	3.10	3.50	0.70
	Max Peak Flow (l/s)	**53.00**	45.12	35.53	20.90	14.76	8.69	2.21
	Peak Factor	**1.82**	5.75	2.10	2.61	4.76	2.48	3.16
WET	Peak Wet Flow (l/s)	**165.00**[1]	45.83	135.21	21.30	10.65	12.68	4.02
	Peak Factor	**5.67**	5.84	8.00	2.66	3.44	3.62	5.74

[1] Measured flow assumed to be limited by the capacity of 375 mm trunk main. Actual flow estimated to be significantly higher.

2.1.1 Flow Data Analysis

As shown in the flow monitoring results, the Town experiences typical dry weather average and peak wastewater flows that are consistent with the size of the Town. However, during wet weather flows significant quantities of inflow/infiltration (I/I) enter the sewage collection system causing capacity issues with the potential for surcharging. This is most evident in the South Trunk system.

From the 2010 to 2011 City of Medicine Hat data and the 3 months of 2012 City data, the City's flow meter at the sanitary gate reads a maximum peak wet weather flow of around 165 l/s. Closer analysis of the individual rainstorms show the flow meter will measure a sustained peak of approximately 165 l/s about 3 to 4 hours after a significant rain event. It is unusual for a peak flow to be sustained, so MPE checked with the City of Medicine Hat Environmental Utilities Department (EU) and confirmed the upper end of the calibration span of their flow meter is 300 l/s. Based on the GIS information we received from the Town, a hydraulic capacity calculation on the pipe estimates the hydraulic capacity of the 375 mm diameter sections of trunk exiting the Town towards the sanitary gate to be between 134 l/s and 180 l/s. It is believed that the trunk's hydraulic capacity is limiting the flows to the City of Medicine Hat's system to approximately 165 l/s, thus causing the sustained peak flow being witnessed. Further supporting this, visual inspections of the manholes in the area show signs of debris nearing the rim of the manhole suggesting that these manholes surcharge and back-up. Town staff also report evidence of wastewater

surcharges on the ground surface around these manholes. Currently, there is no development near the southeast area towards the sanitary gate so the surcharge may not be affecting any residences at present but a sewage overflow in the area during a major rain event is likely occurring. The actual peak wet weather flows for the Town cannot be interpreted from the City's flow meter due to this capacity constraint.

The total measured I/I for the overall Town is approximately 149 l/s. This was obtained from summing the measured peak wet weather flows of each trunk to get 202 l/s minus the peak dry flow at the City flow meter of 53 l/s.

For comparison, I/I flow generation parameters for the Town of Redcliff, City of Lethbridge, City of Medicine Hat, and ESRD are provided in Section 3.3, Table 13 of this report. Using these standards to generate a calculated value for I/I flow (based on an existing estimated area of 202 hectares for residential and 198 hectares of non-residential as measured by land use maps) is:

- Town of Redcliff Standard: 96 l/s.
- City of Lethbridge Standard (old residential areas): 147 l/s.
- City of Medicine Hat MSSM: 69.6 l/s.
- ESRD Standards and Guidelines: 112 l/s.

The above calculated I/I generation standards are used for flow estimating purposes which average new and old systems that take into account I/I issues in existing wastewater systems. Therefore these standards tend to be conservative (i.e. high). The City of Lethbridge generation standards are based on actual measured flow data and I/I studies in Lethbridge which is a very close approximation of the I/I measured from flow data in Redcliff (I/I calculated to be 147 l/s using Lethbridge generation standards and measured 149 l/s from SFE flow data in Redcliff).

A best practice guide for "Infiltration/Inflow Control/Reduction for Wastewater Collection Systems," written by the National Guide to Sustainable Municipal Infrastructure (Canada) dated March 2003 offers examples of suggested "acceptable" levels of I/I for existing wastewater systems. Two examples of acceptable levels are:

- 11,200 l/ha/day - this equates to 51.8 l/s for the entire Town based on the existing 400 hectares

of developed area.

- 1,000 l/cap/day – this equates to 64.8 l/s for the entire Town based on 5,600 people.

Comparing the measured I/I flows from the Town to the generation standards and the "acceptable" levels of I/I guidelines, the Town demonstrates excessive I/I.

During the flow monitoring period, 37 rain events took place but only one event, on June 19, 2012, was considered "significant." From the City of Medicine Hat's Intensity Duration Frequency (IDF) curve found in the MSSM, the June 19 event was a 1 in 2 year storm. This storm is considered a relatively minor event in terms of the rainfall intensity and duration that has been seen in the area in the past. Table 6 shows the top 10 rain events measured by amount of rain, intensity and duration and their respective effects on the measured flows in the system. The intensity, duration and amount of rain seem to affect the peak weather flow rates immensely. It should be noted that even minor rain events measurably affect the Town's wet weather flows.

Table 6: Top 10 Selected Rain Events - May 16, 2012 to August 13, 2012

Rain Events				Measured Flow (l/s)						
DATE	TOTAL RAIN (mm)	TOTAL DURATION (min)	MAXIMUM INTENSITY (mm/hr)	Peak Flow at City Gate	NW Trunk A01	South Trunk A01a	North Trunk A03a	D965 A02	D8C4 A02a	D8E7 A03
Average Flow (l/s)				29..08	7.70	16.90	8.00	3.10	3.50	0.70
May 27/12	19.75	1,440	3.00	71.00	43.00			9.70		2.21
May 29/12	5.31	120	15.24	57.00	37.75			7.90		1.74
June 10/12	20.65	540	9.12	107.00	44.00			10.65		2.86
June 14/12	0.76	10	6.12	47.00	36.32			5.57		1.89
June 17/12	1.00	10	6.12	50.00	35.00			5.50		2.76
June 19/12	31.29	1,080	42.72	165.00		135.21			12.68	
June 25/12	3.43	10	42.72	91.00		38.70			5.50	
July 1/12	7.07	180	9.12	74.00		33.09			6.00	
July 15/12	9.37	55	54.84	107.00		50.14	21.30		6.50	
August 13/12	8.10	90	21.36	163.00		22.37	18.00		5.50	

Significant Rain Event

No Flow Data

The rain events for June 10, 2012 and June 19, 2012 are shown on Chart 1 and Chart 2 respectively in Appendix B. The peak spike in flow at the City's flow meter shows how the rain event affects the sanitary system almost immediately after it begins. Within approximately three hours of the rain events starting, the wet weather flow spike is witnessed by the City's flow meter. This immediate response suggests significant I/I into the Town's system.

SFE Site A01a was located in manhole DA03 (20th Street South) which collects the South Trunk system's flow. The flow monitoring shows wet weather surcharge flows of eight times the average flow for the June 19 storm event. The South Trunk's spike in peak flow rapidly increases about 3 hours after the highest intensity of the rain event. This rapid response to the rain event and magnitude of the peak suggests significant I/I into this trunk. This trunk system picks up some of the oldest parts of the Town where there is generally no stormwater sewer system. The age and condition of the mains also contribute to the I/I effect. It is known to the Town that some residences have sump pumps and weeping tile that connect directly to the sanitary system (which was common practice years ago). This may be a significant source of I/I.

SFE Site A02 was located in manhole D965 (519 Main Street) which collects downtown commercial and residential areas which eventually lead to the South Trunk system. D965 is seven manholes downstream of the discharge of the Factory Lift Station forcemain. As such, the flow is characteristic of pump on peaks and pump off minimums (See Chart 1). On the June 10, 2012 rain event, a peak wet flow is observed at about 10:00 am – about 2 hours after the most intense part of the storm and 1 hour before the peak flow reaches the City gate. The peak response on Chart 1 suggests I/I entering the system upstream of the flow monitoring equipment and downstream of the forcemain discharge. A peak wet factor of 3.4 times the average is seen at this flow monitoring station. This peak factor is not as high as what is seen downstream on the South Trunk which may suggest that the larger scale I/I contributions are further downstream or elsewhere in this trunk system. The downtown core area has a dedicated stormwater collection system that may explain the reduced I/I peaks in this section.

SFE Site A02a was located in manhole D8C4 (intersection of 1st Street and 8th Avenue) which collects primarily older residential and downtown commercial areas which lead to the South Trunk system. Interestingly, the peak wet flow during the June 19, 2012 rain event coincides with the time of peak flow at the City gate which is about 3 to 4 hours after the highest intensity of this rain event. This slower response could be related to the infiltration component of I/I. A peak wet factor of 3.6 times the average is seen at this flow monitoring station. This peak factor is not as high as what is seen downstream on the South Trunk which could suggest that the larger scale I/I contributions are further downstream or elsewhere in this trunk. The downtown core area has a dedicated stormwater collection system that may explain the reduced I/I peaks in this section.

SFE Site A03 (664 2nd Street) was located in manhole D8E7 which collects an area primarily containing older residential neighbourhoods which lead to the South Trunk system. Although it does not appear that a significant peak flow is witnessed during the June 10, 2012 event (due to the Chart 1's scale), there is actually a 5.7 times the average peak wet factor measured during this rain event about 3 hours after the rain event suggesting significant I/I in this area that is contributing to the overall I/I problems in the South Trunk system. The delay in peak response may be related to infiltration or to basement sump pumps kicking in shortly after a rain storm.

The flow monitoring station on the NW Trunk (SFE Site A01, 1001 Broadway Avenue NW) is located on the downstream side of the discharge of the forcemain from the 3rd Avenue NW lift station. During a rain event, the measured peak flows are about 45 l/s, which is close to the measured discharge, (measured by drawdown tests) of the NW lift station and forcemain. The characteristic pump on (peak) and pump off (minimum) flows are shown in Chart 1. The chart shows that about 2 hours after the highest intensity of the June 10, 2012 rain event the flow data measures continuous discharge (about 10:00 am). This suggests that the pump(s) at the 3rd Avenue NW lift station are continuously running during this period for about 1 hour. From discussions with Town staff, high level alarms have occurred at the 3rd Avenue NW lift station during rain events in the past. There are known I/I issues in the NW area as a study by EXH in 2002 identified I/I problems during the 3rd Avenue NW lift station design report. No specific I/I contributor or any resolutions were found during this study. It is recommended that additional flow monitoring equipment be placed in areas on the upstream side of the 3rd Avenue NW lift station to gather more information to better quantify the amount and locations of I/I in this area.

For the North Industrial Trunk system measured by SFE Site A03a (intersection of Saamis Drive and 20th Street), the flow monitoring station observed low average, peak dry, and peak wet weather flows for an area of this size. This may be as a result of the current density and type of businesses in the area. To MPE's knowledge there are no major wastewater generating industries currently in this contributing area. The low observed wet weather flows may be due to this area having a dedicated stormwater collection system.

2.1.2 Recommendations

The timeframe of flow data collection for each station is displayed in Table 6. The flow stations generally picked up a very limited window of data and only minor rain events. Due to this short window of flow monitoring (three months for all sites) and lack of major rain events, MPE recommends that additional flow monitoring be obtained for a longer period of time on the wastewater system to further observe the effect of a more intense storm such as a 1 in 5 year storm.

The South Trunk observes wet weather flow rates eight times the average flows suggesting significant I/I into this trunk. The flow monitoring stations downstream of the downtown core area do not show as high wet weather peak factors as measured furthest downstream of the South Trunk system near the sanitary gate. This is possibly due to the dedicated stormwater collection system in the downtown core area. This suggests that significant I/I is entering the South Trunk system elsewhere. It is known to the Town that there are basement sump pumps and possibly roof drains connected to the system in areas where there is no dedicated stormwater systems. It is recommended to review the possibility of disconnecting sump pumps and roof drains from the wastewater system or install dedicated stormwater collection systems in these older areas. Further flow monitoring programs will help narrow down the areas of high I/I within this trunk system followed by a smoke testing program.

The NW area has been known to surcharge the 3rd Avenue NW lift station during wet weather. As no flow monitoring data exists upstream of the lift station it is recommended that additional flow monitoring programs be setup to further quantify and get a sense of the actual dry and wet weather flows in the NW area. A magnetic flow meter could also be installed at the lift station to monitor flows on the in the 3rd Avenue NW Lift Station.

2.2 Existing Wastewater System Capacity Assessment

2.2.1 Model Development

As part of this study, a hydraulic model of the Town's wastewater system was developed in Microsoft Excel spreadsheet format. The model was developed to analyse the performance of the existing and future collection system.

The model uses Manning's equation and Town provided GIS data of their existing system (pipe inverts, pipe sizes, pipe material types, lengths and locations) to estimate the theoretical capacity of each pipe section in the Town. Some survey pickup was done for a few missing manholes as requested by the Town (see Appendix G) but in general, the GIS data was not verified against as-built drawings, surveys, etc. As the recommendations of this report are carried out and projects advance to preliminary and detailed design phases, further survey of the system will be required.

The GIS data contained a few invert and pipe slope inconsistencies (negative slopes). In these cases, an assumption was made to adjust to positive slopes. The model contains notes where the GIS data was adjusted. These should be verified by survey.

Residential lots for each pipe segment were counted from an air photo and legal line work provided by the Town. An assumption of 2.6 persons per household was made based on the 2011 Statistics Canada Census data. Commercial, horticultural, and industrial contributing areas were generated from air photo, legal line work and land use maps provided by the Town. The model calculates flows based on land use and user inputted generation numbers.

For the model, a Manning "n" roughness coefficient of 0.013 was applied to existing PVC gravity sewers and 0.015 was applied to existing VCT gravity sewers to determine the hydraulic capacity of each main. These high roughness coefficients model the deterioration of the sewer system over time (cracks, open joints, holes, tree roots, grease buildup etc.). For comparison, new PVC is generally between 0.009 and 0.011 and new VCT is between 0.011 and 0.014.

2.2.2 Model Calibration

Table 7 summarizes the model calibration parameters (model inputs) that best generate flows to match the measured data from the SFE flow monitoring stations for average, peak dry, and peak wet flows. The calibration parameters were obtained by trial and error methods until a best fit was found in the model to best match the measured flow data. Table 8 summarizes the generated flows when the calibration parameters are input into the model. It is important to note that a very high I/I allowance is calibrated for residential areas which are mostly generated from the South Trunk system.

Table 7: Summary of Calibration Parameters From Model

Residential	**Average Flows**	260 l/cap/day
	Peak Factor (P_f)	2.23
	Peak Dry Weather	580 l/cap/day
	Inflow/ Infiltration Allowance	0.60 l/s/ha or 1870 l/cap/day (add to peak dry flow)
Non - Residential	**Commercial Average**	0.18 l/s/ha
	Industrial Average	0.035 l/s/ha
	Horticultural Average	0.20 l/s/ha
	Peak Factors	2.0 - Commercial 2.0 - Horticultural 3.0 - Industrial
	Inflow/ Infiltration Allowance **(add to peak dry flow)**	Commercial: 0.06 l/s/ha Industrial: 0.02 l/s/ha Horticultural: 0.20 l/s/ha

Table 8: Summary of Calibrated Results						
	Flow Monitoring (May 2012 to August 2012)			Calibrated Model Results		
	Average Dry Flow (l/s)	Peak Dry (l/s)	Peak Wet (l/s)	Average Flow (l/s)	Peak Dry (l/s)	Peak Wet (l/s)
South Trunk	16.90	35.53	135.21	16.64	36.59	141.21
North Trunk	8.00	20.90	21.30	9.04	21.58	26.57
Northwest Trunk	11.10[1]	25.00[1]	45.83	10.68	22.50	46.77
To City of Medicine Hat (Based on Sum of Trunks)	36.00	81.43	202.34	36.35	80.67	214.55
To City of Medicine Hat (Measured by City Flow Meter)	29.08	53.00	165[2]			

[1]No flow data upstream of NW Lift Station. Calibration parameters from "Lift Station/Trunk Sewer Conceptual Review 3rd Avenue NW Lift Station" by EXH Engineering August 16, 2002.
[2]Limited by hydraulic capacity of 375 mm trunk to City

Based on the dry weather and the limited wet weather flow verifications, the model is considered sufficiently calibrated and characteristic of the actual system performance for use in this wastewater system evaluation. Further flow monitoring programs would allow ongoing development and refinement of the model.

It is noted that there is a difference between each trunk's flows measured separately and summed together for a total flow to the City then from the actual City flow meter readings at the gate. This difference may be explained by the fact that each trunk may show their peak flow rates at different times of the day depending on their contributing land uses. Residential peaks, commercial and industrial peaks may be at different times of the day and not peak the system at exactly the same time. For modelling and analysis purposes, the peak flow rates of each Trunk system are assumed to happen at the same time (worst-case scenario). Also note that since the capacity of the 375 mm trunk to the City is limiting the flows so that the measured flow at the City's meter reads a maximum flow of 165 l/s, the actual peak wet weather flows cannot be interpreted from the City's flow data.

For calibration purposes of the model only, it is assumed that each lift station discharges the model generated peak flows and not the duty points of each lift station. The duty point is the theoretical flow output of the pump(s) based on pump curves and system curves (hydraulic losses in the forcemain due to static and dynamic forces). If the duty points were used for each lift station and carried through the

entire system to the sanitary gate, the model would output unrealistic generated flows. Theoretically, the discharge flow of each lift station at the discharge manhole should be the duty point flow and this flow should be carried through the system to the end but it has been observed that there is a "normalizing" effect to the discharge flow due to friction losses in the mains and manholes that would average out the peaks by the time the flows reach the City gate. Further to support this, the flow measurements eight manholes downstream of Factory lift station (SFE Site A02) read peak dry flows at about 5.0 l/s whereas the discharge of the lift station should be 8.6 l/s (based on the measured discharge of 17.1 l/s and 50% flow because the discharge "splits" directions in an upstream manhole).

For existing and future hydraulic capacity analysis, it is assumed that each lift station will discharge at its respective duty point (measured by drawdown tests) and that peak flow will be carried through the system (worst-case scenario).

2.2.3 Existing Wastewater System Performance

The performance of the existing sanitary system was analysed using the Excel model. The model calculates flow and capacity of every pipe in the system using the calibrated generation numbers under both peak dry and peak wet weather flow conditions. Table 9 describes the capacity conditions. Any pipe segments that are greater than 100% capacity may result in problems such as surcharging, overflows, and basement backups.

Table 9: Hydraulic Performance

Hydraulic Capacity	Description
< 86%	Peak flows are within ESRD Standards.
86% - 100%	Peak flows are above ESRD Standards but are within pipe capacity of the main.
100% - 150%	Peak flows are up to 1.5 times the full capacity.
150% - 250%	Peak flows are between 1.5 and 2.5 times the full capacity.
> 250%	Peak flows are over 2.5 times the full capacity.

The model results for the existing hydraulic capacity constraints are shown in Figures 7A and 7B. The sanitary system performs adequately under peak dry conditions. However, due to the significant increase in wet weather flows, there are a number of areas where the risk of sanitary sewer overflow is possible under peak wet conditions. Most of these areas are along the South Trunk system. The full tabled results of the model can be found in Appendix C.

Figures 7A and 7B identify five areas that could experience capacity constraints under peak wet weather flows. These areas are described below. No capacity constraints are evident in the North Industrial Trunk system.

***AREA 1** – 3rd Avenue NW from 4th Street NW to 5th Street NW (NW Trunk System)*

List of capacity constraints:

- Manhole D9CC to D93E - 104 meters of 200 mm PVC main.

The model shows that this section of main is currently just over the ESRD standard for peak wet weather flows (89% capacity). It is possible that this section may experience some surcharging during rain events and because this section is in a developed area, the surcharging may cause sewer backups in basements.

Recommendations:

- Since this section of main is measured at below minimum slope with GPS survey, it is recommended to use a rod and level to obtain better accuracy of pipe slope. Once a more accurate slope is obtained, this may better show the actual hydraulics of the main and perhaps eliminate the capacity issue from the model.
- A closer analysis of grades, condition, and any operational problems in this main to determine if this section is warranted for upgrades immediately or in the future as development progresses. This section of main will require an upgrade to 300 mm PVC (from 200 mm) to account for future development in the NW area as described in Section 3.0 of this report.

***AREA 2** – Broadfoot Place SW to 8th Ave SE (South Trunk System)*

List of capacity constraints:

- Manhole D966 to D99D: 2 sections of 200 mm PVC main totalling 147 m of pipe.
- Manhole 13770 to D8F0: 2 sections of 250 mm VCT main totalling 155 m of pipe.

The capacity constraints in this section of main begin at the discharge of the Jesmond Lift Station forcemain. The discharge of the forcemain may cause surcharging in the gravity mains downstream during peak wet weather conditions. Because of several residential lots tied into these mains, basement backups may occur.

Due to future development of the Bayliss area, flows will be increased to the Jesmond Lift Station requiring an upgrade to the lift station. The increased flows will require the mains to be upsized downstream of the forcemain discharge. This is described in Section 3.0 of this report.

Recommendations:

- Confirm the slopes of these sections with a rod and level survey for better accuracy. The section from D964 to D966D is showing the main at 132% capacity due to the pipe slope being extremely flat for a 200 mm pipe.
- Confirm pipe sizes from 13770 to D8F1. GIS data shows the main downsizing to 250 mm from previous sections of mains which are 300 mm diameter. If the VCT mains are in fact 300 mm, the mains are currently sized appropriately.
- Confirm if the discharge from the Jesmond area enters the old VCT main as the GIS data and model currently show or if the discharge enters the parallel 450 mm PVC main in Main Street. According to the model, the capacity of the 450 mm PVC main will handle these additional flows.
- Upgrade the following as required:
    - Tie-in the main at 6th Avenue SW to the existing 450 mm main in Main Street. Due to future expected flows from the Bayliss area, upgrades will be required for the Jesmond Lift Station and the gravity mains downstream of the forcemain discharge to Main Street. 260 meters of gravity main will require upgrades to 300 mm PVC mains based on

current GIS provided pipe inverts. The 450 mm main in Main Street has sufficient capacity to handle all existing and future flows from this area.

- The VCT mains in Main Street were installed in the 1950's. It is anticipated that all of the mains in the area (not just the capacity constraints) will require replacement within the next 5-20 years due to the age. A condition assessment of all manholes and mains in this area along with the identified capacity constraints will help prioritize replacement.

AREA 3 *– Broadway Avenue from 1st Street SE to 3rd Street SE, 1st Street SE from 2nd Avenue SE to 3rd Avenue SE and 1st Street SE from 8th Avenue SE to 9th Avenue SE(South Trunk System)*

List of capacity constraints:

- Manhole D9EE to D9EA: 2 sections of 200 mm VCT main totalling 210 m of pipe.
- Manhole D977 to D968: 2 sections of 250 mm VCT main totalling 229 m of pipe.
- Manhole D8DF to D8C4: 1 sections of 300 mm VCT main totalling 104 m of pipe.

There are no future development generated flows expected in these sections.

Recommendations:

- Confirm inverts and pipe slopes with rod and level survey.
- The VCT mains in this area were installed in the 1950's. It is anticipated that all of the mains in the area (not just the capacity constraints) will require replacement within the next 5-20 years due to the age. A condition assessment of all manholes and mains in this area along with the identified capacity constraints will help prioritize replacement.
- Based on the existing GIS pipe slopes, to rectify the identified capacity constraints, upgrade the existing 200 mm mains on Broadway Avenue to 250 mm PVC. Upgrade the existing 250 mm main on 1st Ave to PVC of same pipe diameter as existing (upgrading to PVC increases flow capacity compared to old VCT pipe). Upgrade the 300 mm main on 1st Avenue to 375 mm PVC.

AREA 4 *- 2nd Street SE from 6th Ave SE to 9th Ave SE (South Trunk System)*

List of capacity constraints:

- Manhole D8D8 to D8D9 (6th Ave SE): 1 section of 200 mm VCT main totalling 105 m of pipe.
- Manhole D8E6 to D8E5: 1 section of 250 mm VCT main totalling 99 m of pipe.

- Manhole D8C5 to D8B9: 1 section of 200 mm VCT main totalling 108 m of pipe.

There are no future development generated flows expected in these sections.

Recommendations:

- Confirm inverts and pipe slopes with rod and level survey.
- Confirm pipe diameter from D8C5 to D8B9 as GIS data shows pipe size downsizes from 250 mm to 200 mm from previous section. A 250 mm VCT main in this section will not show any capacity issue.
- The VCT mains in this area were installed in the 1950's. It is anticipated that all of the mains in the area (not just the capacity constraints) will require replacement within the next 5-20 years due to the age. A condition assessment of all manholes and mains in this area along with the identified capacity constraints will help prioritize replacement.
- To rectify the identified capacity constraints, upgrade the three sections to 250 mm PVC mains (based on existing GIS survey data). Upgrading to PVC mains will provide better flow capacity than the old VCT pipe.

AREA 5 *- 9th Ave SE from 1st Street SE to 20th Street SE (South Trunk System)*

List of capacity constraints:

- Manhole D8BB to DA0E: 11 sections of 450 mm VCT main totalling 1,034 m of pipe.
- Manhole DA0E to DA0A: 3 sections of 450 mm PVC main totalling 343 m of pipe.
- Manhole DA0A to E86F: 9 Sections of 375 mm VCT main totalling 1,018 m of pipe.

This section of trunk has currently surpassed its hydraulic capacity to handle peak wet weather flows. Surcharging and sewer backups are expected in this trunk during peak wet weather events. As discussed in Section 2.1, there is physical evidence of manholes surcharging near 20th Street SE. Immediate upgrades are required in this trunk system prior to any added flows from any future development.

Future development is expected to add additional flows to this trunk system (discussed in Section 3.0 of this report).

Recommendations:

- Confirm inverts and pipe slopes with survey.
- Continue efforts to isolate and reduce the I/I seen in this trunk system.

- Based on the model for future development discussed in Section 3.0 of this report, this trunk system will require an upgrade to include approximately 200 meters of 525 mm PVC pipe and 2,200 meters of 600 mm PVC trunk main from Main Street to 20th Street East. The pipe sizing is based on existing GIS provided inverts which are to be confirmed in preliminary design. Upgrades to this trunk system are considered top priority.

2.2.4 Summary of Recommendations and Cost Estimates

A summary of upgrade areas and estimated project costs are shown in Table 10. The sections identified for replacement and associated cost estimates are based solely on the identified capacity issues from the model. Detailed cost estimates can be found in Appendix D.

Table 10: Summary of Short Term Upgrades

	Description	Estimated Cost
Area 1	Replace 104 m with 375 mm PVC.	$289,000
Area 2	Replace 260 m of 200 mm PVC with 250 mm PVC. Tie to existing 450 mm PVC main in Main Street.	$576,000
Area 3	Based on hydraulic capacity replace: 210 m of 200 mm mains with 250 mm PVC, 230 m of 250 mm mains with PVC, and 190 m of 300 mm mains with 375 mm PVC.	$1,763,000
Area 4	Based on hydraulic capacity replace: 313 m with 250 mm PVC mains	$971,000
Area 5	Replace: 200 m of trunk main with 525 mm PVC. 2,200 m of trunk main with 600 mm PVC	$7,515,000

The recommended pipe sizes are based on Town provided GIS data that may contain discrepancies. Prior to any preliminary engineering work, it is recommended to survey and confirm the pipe inverts, slopes and pipe sizes of any intended upgrade area to confirm the recommended upgrades including the recommended pipe sizes.

Analysis of the City owned trunk main from the sanitary gate to the City of Medicine Hat's system was out of the scope of this study. The existing 375 mm main is currently known to be undersized based on existing peak wet weather flows shown by the City flow meter's readings peaking at 165 l/s. If this main was upgraded, it is estimated the peak existing wet weather flows to the City would reach 215 l/s.

3.0 FUTURE WASTEWATER SYSTEM CAPACITY ASSESSMENT

3.1 Land Use

The overall Town land use map as provided by the Town is shown in Figure 8. The Town's total area encompasses 1,667 ha of land. Currently, approximately 202 ha is developed for residential use, 42.20 ha commercial use, 39.12 ha horticultural use and 116.31 ha industrial use.

The Town identified future areas for development in the Municipal Development Plan 2010. The future growth areas and land uses are summarized in Table 11 below. Where development land area (in hectares) is not specified in any previous reports, the development area is estimated based on land use maps.

Table 11: Growth Areas

Growth Area	Residential (ha)	Commercial (ha)	Industrial (ha)	Horticultural (ha)	Total (ha)
Eastside	143.0	33.5	0.0	0.0	**176.5**
Northside	0.0	10.0	369	0.0	**379.0**
North Gateway	0.0	25.0	0.0	0.0	**25.0**
Northend	50.0	0.0	0.0	20.0	**70.0**
Westend	20.0	0.0	0.0	0.0	**20.0**
Bayliss	0.0	0.0	10.0	10.0	**20.0**
River Terrace	100.0	0.0	0.0	0.0	**100.0**
Total (ha)	**313.0**	**68.5**	**378.9**	**30.0**	**790.4**

3.1.1 Eastside Development

An Area Structure Plan (ASP) was completed by Dr. G. De Vries in October 2001 and subsequently a Functional Servicing Report (FSR) was completed by Stantec Consulting Ltd. in November 2006. The Eastside area encompasses 227 hectares of land owned by the Town of Redcliff and IXL Industries. The plan is to develop residential (143 hectares) and commercial (33.5 hectares) areas.

The ultimate build out population of the Eastside area is 4,247 based on a design population density of 29.7 persons/ha for residential areas.

3.1.2 Northside Development

An ASP was completed for the Northside development by Scheffer Andrew Ltd. in October 2009. The Functional Servicing Report (FSR) is not yet complete at the time of this report. The Northside ASP encompasses a total area of 163 hectares of future developable land for commercial (10 hectares) and industrial (115 hectares) areas. The Town provided an email dated May 9, 2011 and letter titled "Sanitary Sewer for Northside Area" dated January 13, 2011 from Scheffer Andrew outlining a variety of sanitary servicing options for the Northside area.

In addition to the 163 hectares outlined in the ASP, the letter/email includes an additional 215 hectares of land further north for total developable area of the Northside of about 379 hectares of land for commercial and industrial use.

3.1.3 Westside Development

An ASP was completed by Dr. G. De Vries in February 2003 for the Westside to develop residential lots. The subdivision consists of a north side and a south side. The south side is currently fully developed into residential lots (Jesmond Drive SW). 55 residential lots on the north side are yet to be developed. To MPE's knowledge, there is no known plan to develop these north side lots in the near future due to the high cost to service these lots.

3.1.4 North Gateway

Due to its high visibility and access to the Trans Canada Highway and Town arterial roads, this area is to be developed as commercial.

3.1.5 Northend

The Northend area is primarily developed with a mix of residential, horticultural and industrial uses. The Northend area is assumed to continue to develop with mostly residential with some horticultural and industrial land uses. Residential population density is assumed the same as the Eastside development of 19.7 persons/hectare.

3.1.6 Bayliss

The Bayliss area is assumed to continue to develop with horticultural, commercial and light industrial land uses.

3.1.7 Westend

Westend will be a residential growth area that will be overlooking the river. No ASP currently exists for this area.

3.1.8 River Terrace

River Terrace is a future residential growth area for low density estate type lots due to its location in the river valley. For low density area, it is assumed 24 persons / hectare for a total future population of 2,400.

3.2 Population Projections

Historic population figures were obtained from census information on the Statistics Canada website. The latest 2011 Statistics Canada Census shows the population of the Town at 5,588 persons.

Historically, the growth rate over the last five census years (1991, 1996, 2001, 2006, and 2011) averaged 2.0%. As a result of discussions with the Town and review of recent documents with population projections, a population growth rate of 2.5% per year is used to determine the projected growth of the Town of Redcliff.

Historical and projected populations for a 40-year horizon are provided in Table 12. Based on 2011 census data and a projected population growth rate of 2.5%, the Town of Redcliff will reach a population of 15,764 by 2053. 40 years is the projected build-out of all the future areas discussed in this report.

Table 12: Population Projections

Growth Rate Projection	Census Data					Projected Population								
%/yr	**1991**	**1996**	**2001**	**2006**	**2011**	**2013**	**2018**	**2023**	**2028**	**2033**	**2038**	**2043**	**2048**	**2053**
2.5%	3,768	4,104	4,372	5,096	5,588	5,871	6,642	7,515	8,503	9,620	10,884	12,315	13,933	15,764

3.3 Design Standard Recommendation

Table 13 summarizes local design guidelines for sewage generation as well as the calibrated model generation inputs. Table 13 also shows the recommended future development generation parameters which are the generation inputs of future development within the sanitary model. The recommended generation parameters should provide reasonable flow generation numbers for future growth of the Town. The numbers are based on a balance of the calibrated data and industry standards.

The largest future growth area of the Town is the Northside industrial area. Currently, industrial generated flows in the Town are small (0.035 l/s/ha) due to the type of industry and density. It cannot be assumed that this low generation will continue for future growth. Thus, a low to moderate generation rate is assumed for future industrial areas of 0.15 l/s/ha. The recommended I/I values for new development is lower than the value for existing development because new subdivisions are being designed with separate systems for stormwater collection. The allowance for I/I is assumed for deterioration of the system over time.

	Table 13: Recommended Flow Generation Parameters						
		Town of Redcliff	**City of Medicine Hat (MSSM)**	**City of Lethbridge**	**Alberta Environment Standards (ESRD)**	**Calibrated Model with May - August 2012 Flow Data**	**Recommended Parameters for Future Development**
Residential	**Average Flows**	340 l/cap/day	454 l/cap/day	400 l/cap/day	Not Defined. Assume 364 l/cap/day	260 l/cap/day	**300 l/cap/day**
Residential	**Peak Factor (P_f)**	Harmon's[1]	Harmon's[1]	Harmon's[1]	Harmon's[1]	2.23	**Harmon's[1]**
Residential	**Inflow/ Infiltration Allowance**	0.20 l/s/ha	Included in Average Flow (15% of 454 l/cap/day)	New Development: Q_{PDW} + 500 L/cap/day Equivalent to 0.16 l/s/ha[2] Old Development: QPDW+ 2000 L/cap/day Equivalent to 0.64 l/s/ha[2] If Groundwater < 3m deep add: 150 L/cap/day	0.28 l/s/ha + 0.4 L/s for each sag manhole	0.60 l/s/ha	**Existing Residential: 0.60 l/s/ha** **Future Residential: 0.16 l/s/ha**
Non - Residential	**Commercial Average**	40,000 l/ha/day (0.46 l/s/ha)	Not Defined Use ESRD	20 m^3/ha/day (0.23 l/s/ha)	0.46 l/s/ha	0.18 l/s/ha	**0.20 l/s/ha**
Non - Residential	**Industrial Average**	20,000 l/ha/day (0.23 l/s/ha)	Not Defined Use ESRD	30 m^3/ha/day (0.35 l/s/ha)	0.35 l/s/ha	0.035 l/s/ha	**0.15 l/s/ha**
Non - Residential	**Horticultural Average**	N/A	N/A	N/A	N/A	0.20 l/s/ha	**0.20 l/s/ha**
Non - Residential	**Peak Dry Factor**	3.00	Not Defined use ESRD	N/A	= 6.659 * ($Q_{AVG}^{0.832}$) Max 5.0	2.0 Commercial 2.0 Horticultural 3.0 Industrial	**= 6.659 * ($Q_{AVG}^{0.832}$) Max 5.0**
Non - Residential	**Inflow/ Infiltration Allowance**	0.28 l/s/ha	Not Defined Use ESRD	Q_{PDW}+ 7.5m^3/ha/day (0.087 l/s/ha) If Groundwater < 3m deep add: 2.25 m^3/ha/day (0.026 l/s/ha)	0.28 l/s/ha + 0.4 L/s for each sag manhole	Commercial: 0.06 l/s/ha Industrial: 0.02 l/s/ha Horticultural : 0.2 l/s/ha	**Commercial: 0.10 l/s/ha** **Industrial: 0.10 l/s/ha** **Horticultural: 0.10 l/s/ha**

[1] Harmon's Peak Factor = 1+14/(4+POPULATION^0.5)

[2] Assuming Redcliff population of 5,600 with total residential area of 202 hectares

3.4 Projected Flow Rates

The projected future flow rates generated using the recommended flow generation parameters from Table 13 are summarized in Table 14. Using a population growth rate of 2.5%, the time to reach the ultimate build-out of all the future developments is approximately 40 years. Commercial, industrial and horticultural build-outs are assumed to be directly proportional to the population growth. The peak wet weather flow rate for the ultimate 40-year growth horizon of the Town is 733.4 l/s.

Table 14: Projected Flow Rates to Sanitary Gate (From Capacity Model)

Year	Population	Commercial Area (ha)	Industrial/ Horticultural Area (ha)	Average Flow (l/s)	Peak Dry Flow (l/s)	I/I (l/s)	Total Peak Wet Flow (l/s)
2013	5,871	42.20	155.4	36.4	80.7	152.3	**233.0**
2018 (5 years)	6,642	48	187	44.9	112.1	159.9	**272.0**
2023 (10 years)	7,515	54	223	54.6	147.6	168.6	**316.2**
2028 (15 years)	8,503	60	264	65.5	187.8	178.3	**366.1**
2033 (20 years)	9,620	68	310	77.9	233.3	189.4	**422.6**
2038 (25 years)	10,885	77	363	91.8	284.7	201.9	**486.6**
2043 (30 years)	12,315	87	422	107.7	342.9	216.0	**558.9**
2048 (35 years)	13,933	98	489	125.6	408.8	232.0	**640.8**
2053 (40 years)	15,764	111	564	145.8	483.3	250.1	**733.4**

Table 15 summarizes the flows generated by the future developments upon ultimate 40 year projected build out using the recommended flow generation parameters described in Table 13.

Table 15: Summary of Future Generated Peak Wet Weather Flows

Development	Tie-in to Existing System	Trunk System	Residential (l/s)	Commercial (l/s)	Industrial (l/s)	TOTAL (l/s)
Northside	Manhole D897	North Ind. Trunk/NW Trunk	0.0	11.0	224.6	235.6
Eastside	Manhole Varies	NW Trunk/South Trunk	84.3	36.8	0.0	121.1
North Gateway	Manhole D9D4	NW Trunk	0.0	27.5	0.0	27.5
Northend	Manhole D9B2	NW Trunk	27.0	0.0	17.0	44.0
Westend	Manhole	NW Trunk	9.8	0.0	0.0	9.8
Bayliss	Manhole D954	South Trunk	0.0	0.0	17.0	17.0
West Terrace	Manhole D8BB	South Trunk	45.4	0.0	0.0	45.4
		TOTAL (l/s)	**166.5**	**75.3**	**258.6**	**500.4**

For comparison purposes, the ultimate projected flow rates for the Town can be calculated using the various standards and guidelines parameters listed in Table 13. This comparison is shown in Table 16 below. Note that the existing flows for all the standards are based on the calibrated flow data. It is shown that the recommended generation parameters generate much lower future flows. The recommended future flows should be considered a more realistic approximation of the generated future flows of Redcliff assuming similar types of development continue to grow Redcliff, since they are based on actual flow measurement data.

Table 16: Projected Flow Rates Using Standards

Generation Standard	Ultimate (40 year) Flow Rate (l/s)
Recommended	733
Town of Redcliff	1,020
MSSM	1,131
Lethbridge	1,005
ESRD	1,179

3.5 Future Wastewater System Performance

The future performance of the sanitary system was analysed using the Excel model. The future generated flows were analysed only on the existing Town's infrastructure. No future infrastructure (mains, trunks, lift stations) were analysed for capacity as it is assumed they will be designed appropriately at that time. The model calculates flow and capacity of every pipe in the existing system using the calibrated generation numbers under peak wet weather flow conditions.

Table 9 in Section 2.2.3 describes the capacity conditions. Any pipe segments that are greater than 100% capacity may result in problems such as surcharging, overflows, and basement backups.

The model results showing the future hydraulic capacity constraints are shown in Figures 9A and 9B. The full model results can be found in Appendix C.

Northside Industrial

Future development of the Northside industrial area is estimated to generate about 236 l/s of wastewater flow. Based on the information known to date, two options are proposed to connect the future flows generated from the North Industrial Area to the City of Medicine Hat system:

1. The future flows would be diverted to a 2nd sanitary gate that would connect to the City's system in Box Springs. As no new flows will be added to the existing North Industrial area collection system, no upgrades due to hydraulic capacity are expected to be required along the existing system in the North Industrial area. MPE has only analysed the impacts of the 2nd sanitary gate on the Town's infrastructure and not the adjacent City infrastructure in Box Springs. Analysis of the City's infrastructure is outside the scope of this study.

2. The future flows will enter a trunk system beginning at Broadway Avenue and 20th Street East. The trunk will head south along 20th Street to the existing sanitary gate at the SE corner of Town. The upgrade to the existing trunk system would consist of approximately:
    - 945 meters of 600 mm PVC (Broadway Avenue to Saamis Drive)
    - 570 meters of 750 mm PVC (Saamis Drive to sanitary gate)

The above trunk sizing is based on the existing pipe grades in the GIS data. During preliminary design of the future road and sewer grades, it may become evident that with greater pipe slopes, smaller diameter trunks will provide enough capacity to service the entire length. For example, reducing the 750 mm mains may be reduced to 600 mm.

Also note that based on the flow model calibrations and using the existing GIS pipe inverts and slopes, the existing 750 mm NW trunk main does not have sufficient capacity to handle the ultimate Eastside development flow plus the ultimate Northside development flows. It is estimated there will be only about 130 l/s of capacity remaining in the NW trunk once the Eastside is fully developed. Thus, the conceptual recommendation is to twin the existing 750 mm diameter trunk main in 20th Street.

Northwest Trunk System

Five future tie-in locations are added to this Trunk System from North Gateway, Northend, Westend and two connections from the Eastside.

The future flow tie-in location areas are assumed as shown in Figure 9A. Due to the significant projected long-term growth upstream of the 3rd Avenue lift station, the lift station will require upgrades as development dictates. Upon full build-out of the area, the capacity of the 375 mm gravity main sections immediately downstream of the forcemain discharge will also be surpassed. Based on the existing pipe grades provided and full build out of the North Gateway, Northend, Westend and Eastside areas, it is expected that the upgrade to the existing mains will require:

- 990 meters of 300 mm PVC
- 104 meters of 375 mm PVC (Upgraded in Area 1 - Section 2.2.3 of this report)
- 480 meters of 450 mm PVC

South Trunk System

Four future tie-in locations are added to this trunk system from Bayliss, River Terrace and two connections from the Eastside development as shown in Figure 9A. As discussed previously in Section 2.2.3 of this report, this trunk system is currently exceeding its hydraulic capacity during peak wet weather flows. No future flows should be added to this trunk system until the system has been upgraded.

Based on the existing pipe grades provided and full build out of the future Bayliss, River Terrace and Eastside areas, it is expected that a 525 mm and 600 mm PVC trunk main will be required along 9th Avenue from Main Street to 20th Street East. The upgrade will require:

- 205 meters of 525 mm PVC
- 2,200 meters of 600 mm PVC

Previously discussed in Section 2.2.3 of this report, due to future expected flows from the Bayliss area, upgrades will be required to the Jesmond Lift Station and the gravity mains downstream of the forcemain discharge from Broadfoot Place SW to Main Street. The upgrade will require:

- 260 meters of 300 mm PVC
- Tie-in the existing 450 mm main at 6th Avenue SW and Main Street.

The above trunk sizing is based on the existing pipe grades in the GIS data. During preliminary design, it is recommended that additional surveys be completed to confirm pipe slopes. It may become evident from surveyed slopes that a 525 mm diameter trunk may provide enough capacity to service the entire length of this south trunk system..

It is anticipated that the Eastside development area will develop prior to Bayliss and River Terrace.

3.6 Summary of Recommendations and Cost Estimates

A summary of the future upgrade areas and estimated project costs are shown in Table 17 below. Detailed cost estimates can be found in Appendix D. At present, MPE does not have enough information on the City's infrastructure in Box Springs to provide a reasonable capacity assessment and cost estimate for installing a 2nd sanitary gate.

Table 17: Summary of Future Upgrades

Upgrade	Description	Estimated Cost
North Industrial Trunk	Option 1 – Install 2nd sanitary gate to City of Medicine Hat in Box Springs. Option 2 – Install trunk system along 20th Street East from Broadway Avenue to the existing sanitary gate. 945 meters of 600 mm PVC 570 meters of 750 mm PVC	N/A $4,808,000
NW Trunk System	Upgrade: 990 meters of existing main to 300 mm PVC 480 meters of existing main to 450 mm PVC (Upgrade 104 m of 375 mm pipe include in Area 1 of Table 10 of this report)	$3,120,000
South Trunk System	Upgrade costs included in Area 2 and Area 5 of Table 10 of this report.	N/A

Based on the model results, if a 2nd sanitary gate were installed, the future flow at the existing sanitary gate would be about 497 l/s (based on ultimate flow of 733 l/s minus all future North industrial flows of 236 l/s) compared to 733 l/s if only the one existing sanitary gate was used.

In addition to the upgrades to the Town's infrastructure, it is anticipated significant upgrades will be required to the City's infrastructure downstream of Redcliff. Analysis of the City's infrastructure is beyond the scope of this study. It is recommended the Town continue discussions with the City of Medicine Hat to discuss future servicing options such as the 2nd sanitary gate with the City of Medicine Hat.

4.0 LIFT STATIONS

The Town has five sanitary lift stations that are summarized in Table 18. Forcemain lengths, diameter and type are from Town provided GIS. The duty points of each lift station were supplied from Xylem for each lift station except for Jesmond Lift Station where the duty point was not provided. Results of the drawdown test are also shown. Drawdown tests were completed on each lift station with MPE and Town staff on March 18-19, 2013. Full results can be found in Appendix E.

Table 18: Lift Station Summary

Lift Station	Pumps	Xylem Duty Point (l/s)	Drawdown Test Result (l/s)	FM Length (m)	FM Diameter (mm)	FM Type	Pump Order Date
#1 - Factory Lift Station	2 - Flygt NP3127.181 - 10 HP	22.2	17.1	222	150	HDPE	12 August 2011
#2 - Jesmond Drive	2 - Flygt NP3127.180 - 10 HP	N/A	15.3	665	150	PVC	04 September 2002
#3 - 3rd Ave NW	2 - Flygt NP3171.180 - 30 HP	70.5	43.9	1,215	250	PVC	19 September 2003
#4 - Semrau	2 - Flygt MT3102.170 - 6 HP	4.90	4.9	543	75	PVC	03 October 2006
#5 - Redcliff Way (Kipling)	2 - Flygt NP3127.180 - 7.5 HP	27.10	15.6	246	150	PVC	01 March 2000

4.1 Performance

Table 19 summarizes the existing and future design flows based on the existing calibrated model and recommended future generation rates. ESRD standards state that lift stations should be designed to pump peak wet weather flows.

Table 19: Lift Station Performance

Lift Station	Output from Drawdown Test (l/s)	Estimated Existing Average Dry Weather Inflow (l/s)	Estimated Existing Peak Dry Weather Inflow (l/s)	Estimated Existing Peak Wet Weather Flow (l/s)	Estimated FUTURE Peak Wet Weather Flow (l/s)
#1 - Factory	17.1	1.1	2.4	**9.7**	**9.7**
#2 - Jesmond Drive	15.3	1.8	3.8	**11.1**	**28.1**
#3 - 3rd Ave NW	43.9	10.5	22.2	**46.4**	**127.7**
#4 - Semrau	4.9	1.9	3.9	**4.5**	**4.5**
#5 - Redcliff Way	15.6	0.7	1.6	**6.7**	**6.7**

Four out of five of the existing lift stations are in accordance with ESRD Standards for capacity performance under existing modelled flow conditions. The 3rd Avenue NW lift station does not meet this requirement. The measured discharged flow from this lift station is below the existing peak wet weather flow.

Three out of five lift stations are in accordance with ESRD Standards for capacity under future modelled flow generation. The future peak wet weather design flows exceed the capacity of 3rd Avenue NW Lift Station and Jesmond Lift Station based on the growth assumptions in the model. Future upgrades to these lift stations may be required as development progresses.

The peak measured output flow on the 3rd Avenue NW Lift station measured by drawdown tests and by flow monitoring equipment is about 40-45 l/s. Lift station design reports and pump system curves from Xylem show that the duty point for this lift station is 70.5 l/s. A cursory hydraulic analysis on the pumps and forcemain further confirm that the output of the forcemain should be around 70 l/s. We recommend further testing/inspection on the pumps, header pipes and forcemain to confirm the discharge flow and diagnose the lack of output performance measured.

Factory Lift Station and Redcliff Way (Kipling) Lift Station also don't perform when comparing the Xylem provided duty points with the results of the drawdown tests. However, both lift stations are still within capacity for existing and future design flows. We recommend further testing/inspection on the pumps, header pipes and forcemain to confirm the discharge flow and diagnose the lack of output performance measured.

4.2 Visual Condition

A visual inspection of all five lift stations in the Town's wastewater system was completed July 18, 2012. The physical condition of each lift station was evaluated based on discussions with Town staff and visual inspections from the surface of each lift station (no confined space entry). The full inspection reports can be found in Appendix E.

4.2.1 Lift Station #1 – Factory Lift Station

Factory Lift Station is a brand new lift station built in 2012 replacing an old lift station. As such, all components are in "new" condition. A few general comments were provided regarding the site conditions of this lift station area:

- Poor site grading and no drainage. The lift station is the low point of the surrounding area. The site becomes very muddy. Stormwater can enter the wet well causing I/I issues. We recommend reviewing the grades of the surrounding area and develop a stormwater management plan.
- There is poor access for Town's generator trailer to hookup. The hookup is on the far side of the control panel. Also, at the time of this inspection the hookup was not rated for the Town's portable generator, which was to be rectified soon.
- There is no security fence around lift station. The Town reports that security is not an issue.

4.2.2 Lift Station #2 – Jesmond Drive

Jesmond Drive Lift Station was built in 2002/2003 for the Westside residential subdivision. At the time of inspection, the Town did not report any significant problems with this lift station. Overall the lift station is in good condition. A few comments were noted regarding this lift station:

- Residents in the area complain about the odours released from the lift station. The location is in close proximity to back yards.
- There is no security fence around lift station. The Town reports that security is not an issue.
- The wet well backs up quickly to mid-platform grating level during wet weather flows as the wet well is not very deep. There is evidence of debris on the mid-platform grating. The Town reports that during wet weather this lift station shows the second most I/I problems of all of their lift stations (3rd Avenue NW lift station is number 1). Most of the collection area is new residential (PVC pipe) but the lift station does pick up a significant area of older VCT pipe and horticultural areas to the North.
- The ladder is difficult to access when entering wet well due to location and shape of the wet well (round).
- Severe corrosion is evident on the air release valve. The Town plans to replace the metal unit when it fails with a plastic unit.

4.2.3 Lift Station #3 – 3rd Avenue NW

The 3rd Avenue NW lift station was built in 2003/2004 replacing and old lift station in this area. At the time of inspection, the Town did not report any significant problems with this lift station other than it sees significant I/I during rain events. Overall the lift station is in excellent condition. A few comments were noted regarding this lift station:

- There is no security fence around lift station. Town reports that security is not an issue.
- This lift station is known to backup during rain events. There is evidence of debris on mid-platform grating. The Town reports that this lift station sees the most I/I during wet weather than any other lift station in Town. Due to its depth and trunk upgrades in 2003, it has not backed up any basements in the area.
- The grating is installed too far down in wet well. It makes it difficult for maintenance on lights and air release valve.

Drawdown tests performed on this lift station show a discharge of 43.9 l/s, which is well short of the design duty point of 70.5 l/s. It is recommended the Town further review the output of the pumps and forcemain. If there is a flow output issue, resolving it will decrease the wet weather backups seen in this lift station.

4.2.4 Lift Station #4 – Semrau

The Semrau lift station was built in 2006/2007 upgrading an old lift station in the area. At the time of inspection, the Town did not report any significant problems with this lift station. Overall the lift station is in excellent condition. A few comments were noted regarding this lift station:

- The lift station sees very low flows. The lift station normally runs less than 1 hour per day.

4.2.5 Lift Station #5 – Redcliff Way

The Redcliff Way lift station was built in 2000, which makes it the oldest lift station in Town. At the time of inspection, the Town did not report any significant problems with this lift station. Overall the lift station is in good condition. A few comments were noted regarding this lift station:

- 360 degree access to wetwell restricted by permanently parked trailers adjacent to lift station. The Town is not sure where the right-of-way is. Recommend the Town confirm the location of the ROW and place signage and enforce no parking.
- The lifting davits do not provide support to lift pumps. A hoe or crane must be used to lift pumps.
- There is no ladder in wet well, only manhole rungs.
- No air vent or blower installed in wet well.
- The plug valves and check valves are installed above ground in a fibreglass shed. There is fibreglass insulation and a little heater but the valves still freeze in winter.
- There is no air release valve because of the shed.
- There is no auto dialer because there is no phone service to this lift station. Operators know of problems from pump hours.
- The lift station sees very low flows. The lift station normally runs less than 1 hour per day.

4.3 General Recommendations

Overall the lift stations are all relatively new (oldest 13 years) and in good shape. There is no SCADA control in any of the lift stations. The number of hours the pumps run daily is recorded by operators. Only the Factory Lift Station has a magnetic flow meter incorporated into it. It is recommended that the lift stations be retrofitted to include magnetic flow meters. Flow meters can help narrow down and quantify I/I problem areas and get a better sense of flow sewage flows in the Town. The highest priority for installation of a flow meter is the 3rd Avenue NW lift station and the Jesmond Drive lift station where there are known I/I problems.

5.0 CCTV INSPECTIONS

The Town hired Sanatec Environmental to complete CCTV inspections of 1,750 m of sewer mains in the Town. MPE reviewed the CCTV sanitary sewer inspection videos for signs of I/I and general condition of the pipe.

Upon review of the videos, 6 points of infiltration were witnessed where groundwater was seen entering the system and 111 points were assessed as likely points of infiltration. A likely point of infiltration is where no actual infiltration was witnessed in the video but the condition of the pipe is such that it will allow infiltration. The likely points of infiltration occur at open or displaced joints, severe cracks, fractures, and points of root infiltration.

Of the six known points of infiltration, five are around joints to service lateral connections and the sixth is at a root intrusion. A table summarizing the witnessed points of I/I can be found in Appendix F.

Upon review of the CCTV videos for general condition, the witnessed defects within the pipe were noted. These defects can be found in the summary spreadsheet in Appendix F. Each segment of pipe was rated based on the City of Edmonton's Sewer Condition Rating Manual. The condition ratings are based on structural defects (joint displacement, open joints, cracks, fractures, holes, breaks, and sagging) and service defects (debris, roots, encrustation, and infiltration). The structural and service defects are each rated on a scale of 1 to 5 with 1 representing a pipe in good condition and 5 representing a pipe in very poor condition. An overall rating which is the higher of the two ratings was also given for each segment.

The majority of the pipe segments have a rating of 3 for structural, service, and overall defects. The most common defects observed in the inspection videos were debris within the pipe and sagging. These defects are present in nearly every pipe segment. Cracks and fractures are also common in the majority of the pipe segments. While root infiltration is not a problem in the majority of the segments, in the sections where it is present, it is present in high quantities. Open joints, pipe deformation, breaks, and holes all occur in the inspection videos as well but are not common. Displaced joints are common throughout the system, but are often slight and based on what is seen in the videos, MPE does not anticipate these to have a significant effect on I/I or capacity.

6.0 SUMMARY OF RECOMMENDATIONS

6.1 Immediate to Short Term (5 years)

Following are immediate to short term upgrades. The studies should begin immediately followed by implementation of the required upgrades.

Table 20: Immediate to Short Term Upgrades		
Upgrade	**Conceptual Cost**	**Priority**
Upgrade South Trunk from 1st Street SW to sanitary gate (20th Street SE). The design and study will take in the order of 1 to 2 years and should be initiated immediately.	$7,515,000	HIGH
Discuss and finalize future Town servicing options with the City of Medicine Hat which includes the 2nd sanitary gate option and upgrades to the City trunk east of the Town.	N/A	HIGH
Conduct further testing on 3rd Avenue NW lift station to diagnose the poor flow output as current measured output does not meet ESRD Guidelines to pump peak wet weather flows.	N/A	HIGH
Develop a I/I reduction strategy, which will include additional flow monitoring and possibly other tests such as smoke or dye tests, to narrow down the areas of high I/I. Review options for reducing I/I and develop an implementation plan concentrating on the NW area upstream of the lift station and other various areas of the South Trunk system.	$100,000	HIGH
Confirm capacity constraints in the locations listed below. Work will generally include survey (by rod and level) and verification of pipe diameter to confirm capacity. Carry out upgrades on sections that are confirmed to be under capacity.		
• Area 1 – 3rd Avenue NW from 4th Street NW to 5th Street NW	$289,000	LOW
• Area 2 – Broadfoot Place SW to Main Street	$576,000	MEDIUM
• Area 3 – 1st Street SE from Broadway Avenue to 9th Ave SE	$1,763,000	MEDIUM
• Area 4 - 2nd Street SE from 6th Ave SE to 9th Ave SE	$971,000	MEDIUM
Develop a VCT pipe replacement program to prioritize replacement of VCT pipe. Commence replacement of VCT pipe in order of priority.	$50,000 (For Study)	MEDIUM
Consider development of an Infrastructure Master Plan (IMP) to help the Town prioritize upgrades by taking other utilities and roads into account.	$125,000	MEDIUM
Consider installing a magnetic flow meter on the 3rd Ave NW lift station to monitor flow in this area, which seems to have high I/I flows.	$20,000	LOW
Consider installing a magnetic flow meter on the Jesmond lift station to monitor flow in this area, which seems to have high I/I flows.	$20,000	LOW

Install phone service to Redcliff Way lift station with auto-dialer.	$10,000	LOW
Consider upgrades to the wetwell of Redcliff Way lift station to install the header pipes and valves inside the wetwell to avoid freezing.	$200,000	LOW
Install a stable grab bar and proper pump lifting davit on Redcliff Way lift station.	$20,000	LOW
Conduct further testing on Factory Lift Station and Redcliff Way Lift Station to diagnose the lower flow output than the design duty points. These lift stations are within ESRD capacity guidelines but they do not discharge at the Xylem provided pump duty points.	N/A	LOW
TOTAL	$11,659,000	

6.2 Long Term

It is anticipated that ultimate build-out of all the areas in this report will take approximately 40 years. It is expected that Functional Servicing Reports (FSR's) will be completed for all the future development areas. The FSR's should contain staging plans for the development of new infrastructure and required upgrades to existing infrastructure. For the purpose of this study, it is assumed that the following upgrades will be long term (greater than 20 years).

Table 21: Long Term Upgrades

Upgrade	Conceptual Cost
Once North Industrial servicing options are finalized with the City, build a 2nd sanitary gate or upgrade the existing North Trunk system to the existing sanitary gate.	$4,808,000
Upgrade sections of existing mains in the Northwest area to accommodate future development.	$3,120,.000
Upgrade the 3rd Avenue NW lift station as development progresses.	$900,000
Upgrade Jesmond lift station as Bayliss development progresses.	$650,000
Continue VCT replacement program	N/A
Continue I/I reduction strategy	N/A
TOTAL	$9,478,000

6.3 Conceptual Cost Estimates

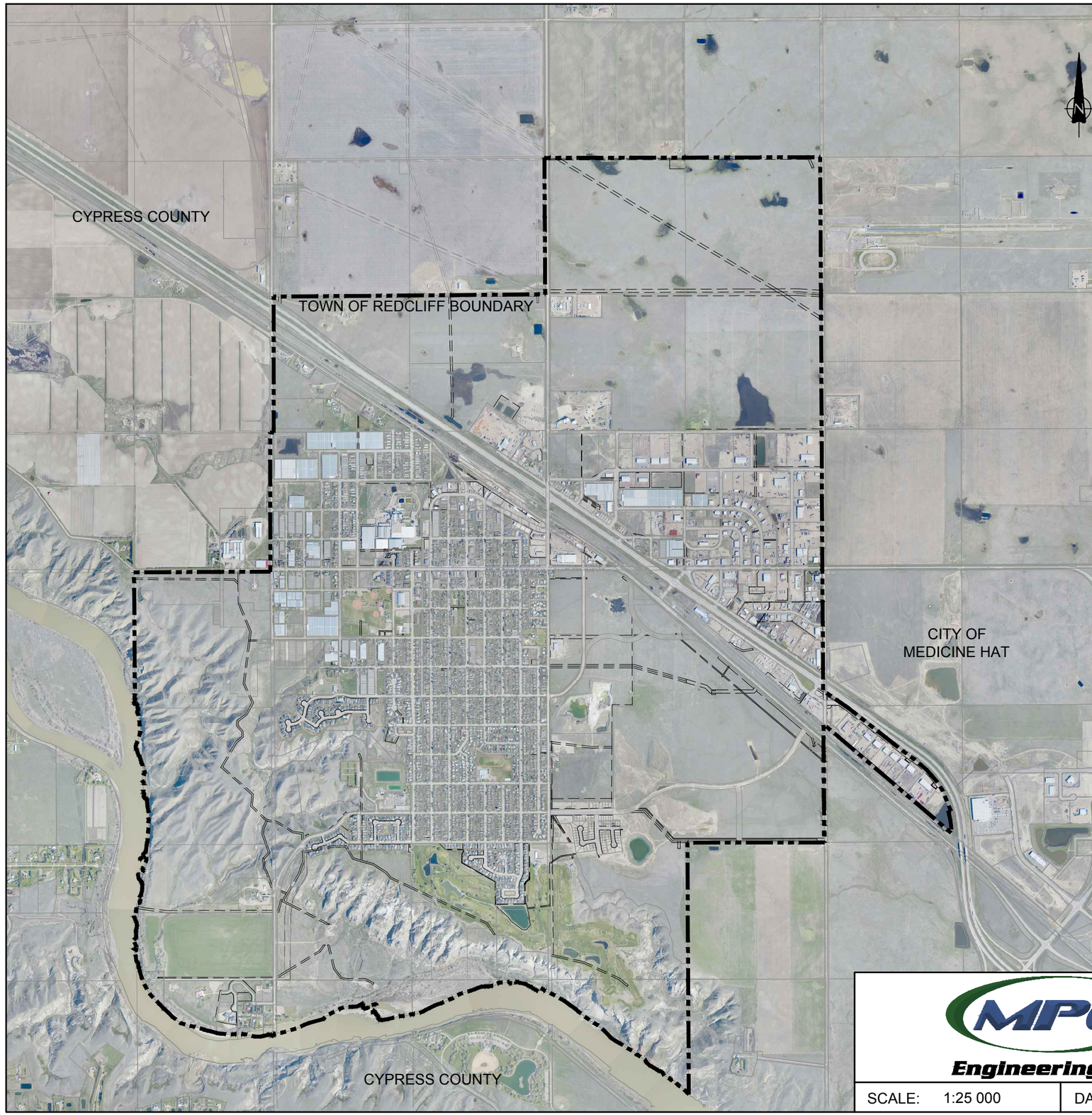
Table 22 shows costs per meter estimates to be applied on a conceptual level to remove and replace 200mm sanitary sewer mains including road rehabilitation. The cost estimates are completed for local residential, collector and undivided major roadway classifications. Details of the cost estimates can be found in Appendix D.

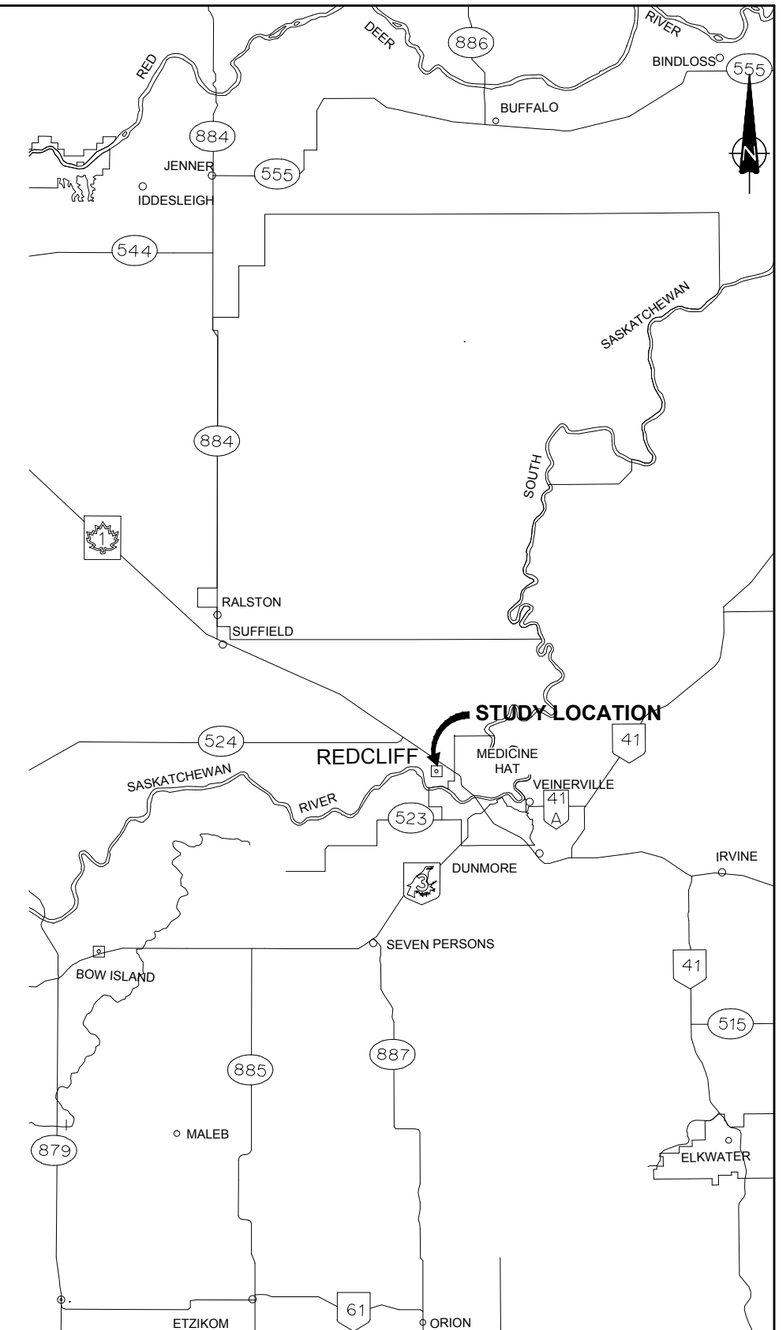
Table 22: Conceptual Cost Estimates

Road Classification	Conceptual Cost ($ / meter)
Local Residential (10.5 m wide)	$3,700
Collector (12 m wide)	$4,000
Undivided Major (14.8 m wide)	$4,600

APPENDIX A

Figures





LOCATION PLAN

MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
SITE PLAN

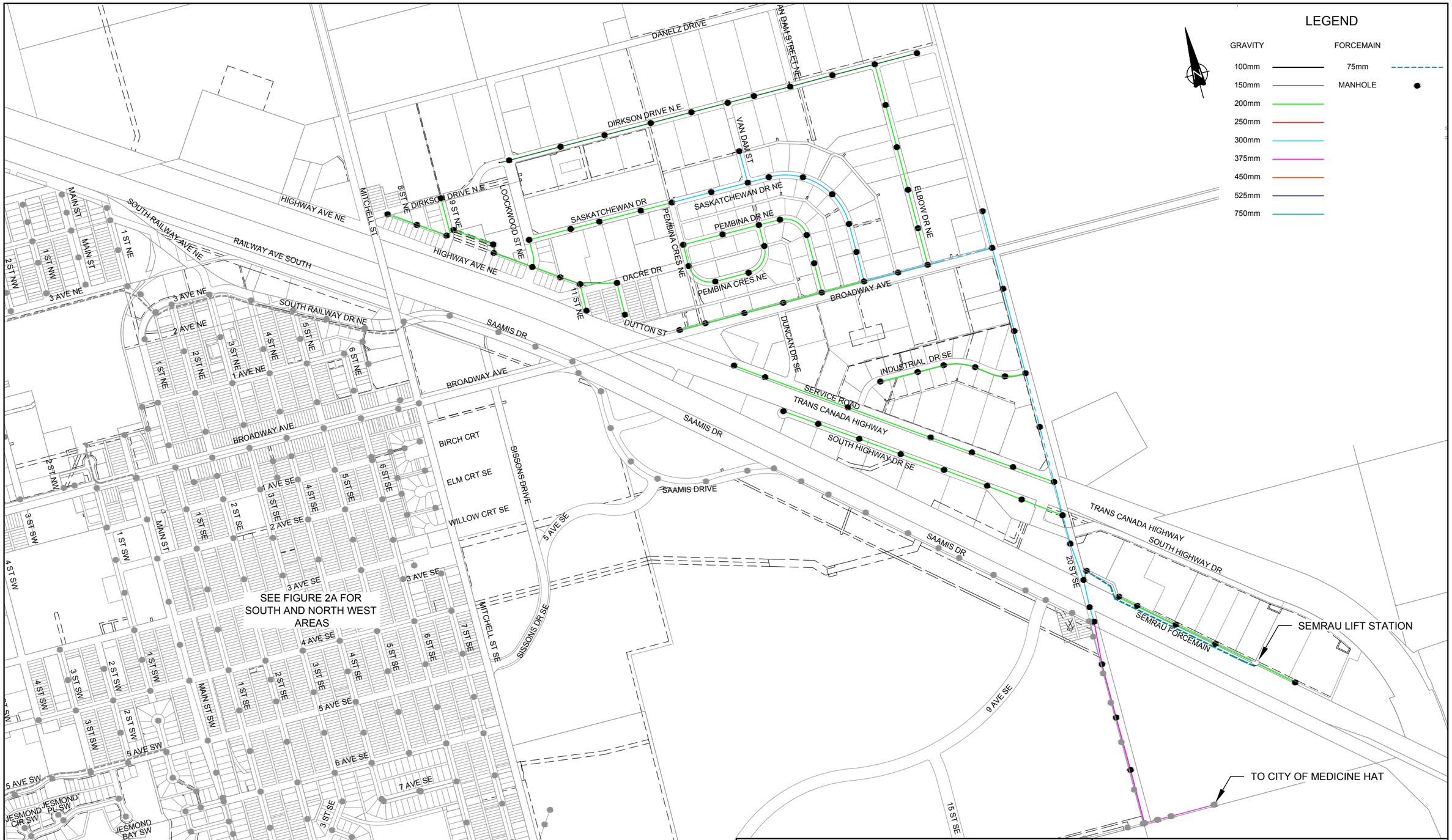
SCALE: 1:25 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 1 138

Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
EXISTING LINE SIZING
SOUTH AND NORTH WEST TRUNK AREAS

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 2A

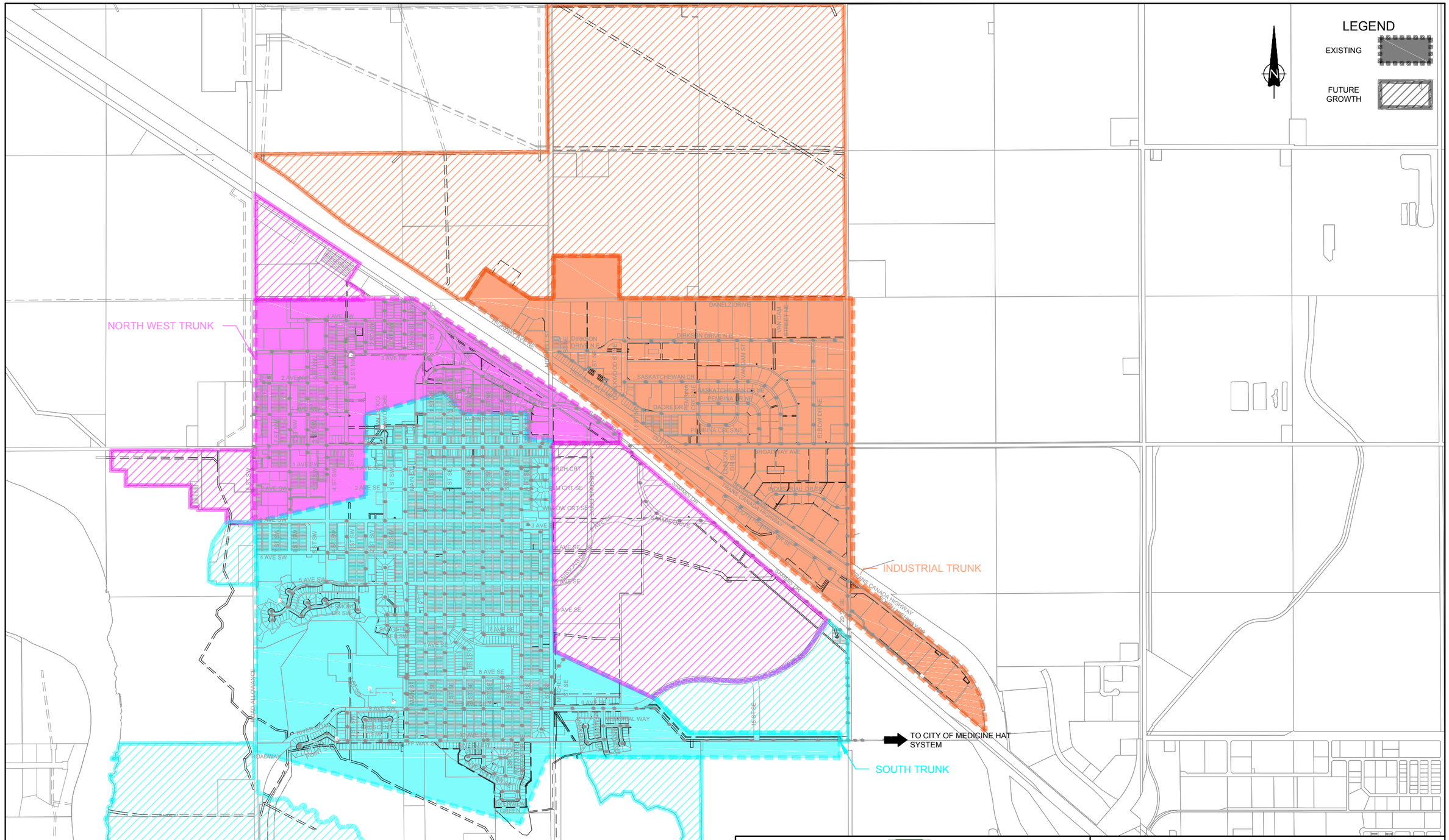


MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
EXISTING LINE SIZING
NORTH INDUSTRIAL AREA

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 2B



MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SANITARY EVALUATION
SANITARY TRUNK SYSTEM

SCALE: 1:20 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 3141

MPE Engineering Ltd.		TOWN OF REDCLIFF WASTEWATER SYSTEM EVALUATION EXISTING LINE MATERIAL SOUTH AND NORTH WEST TRUNK AREAS	
SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 4A

MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
EXISTING LINE MATERIAL
NORTH INDUSTRIAL AREA

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 4B

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
EXISTING LINE AGE
SOUTH AND NORTH WEST AREA

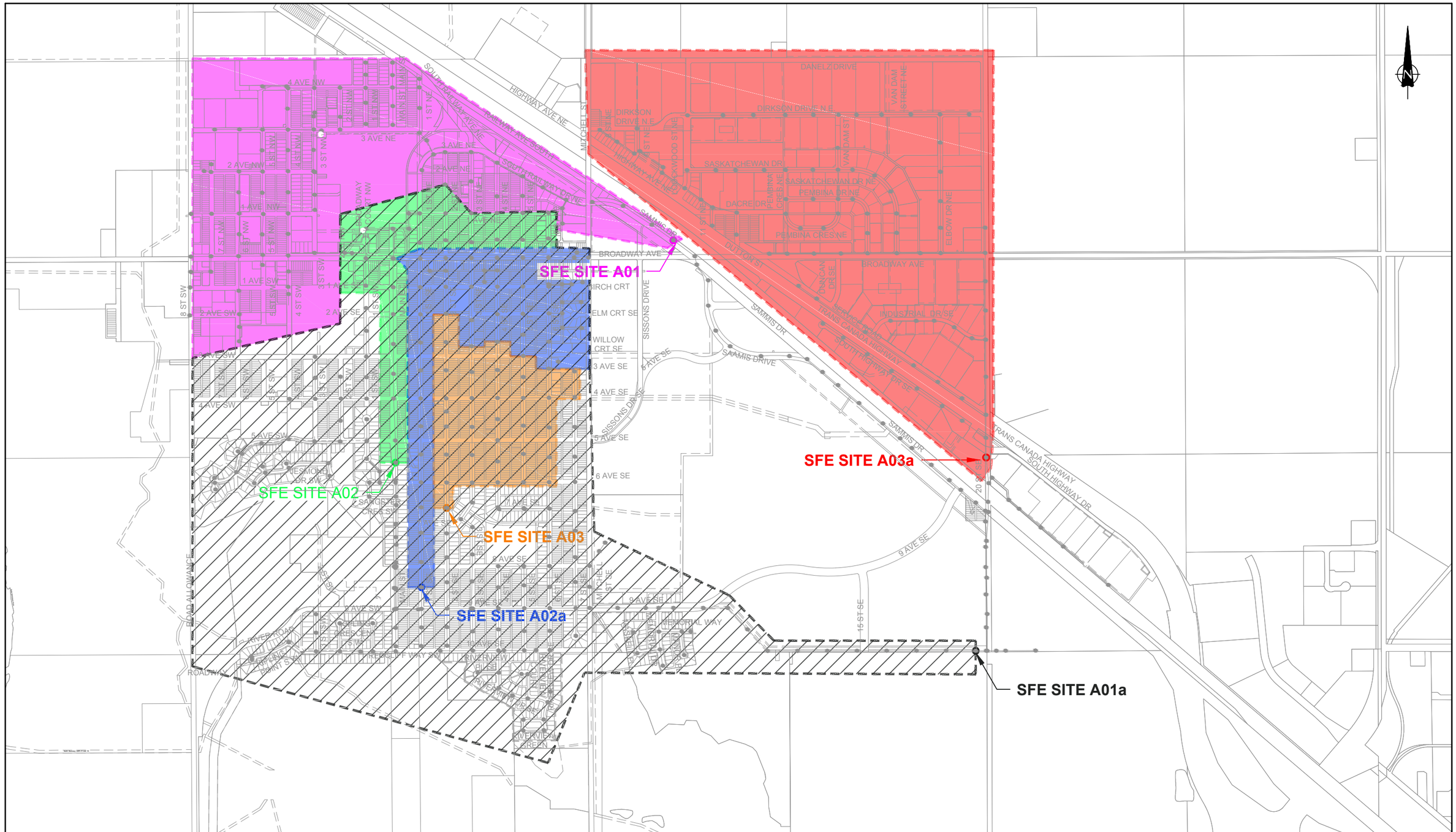
SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 5A

MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
EXISTING LINE AGE
NORTH INDUSTRIAL AREA

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 5B

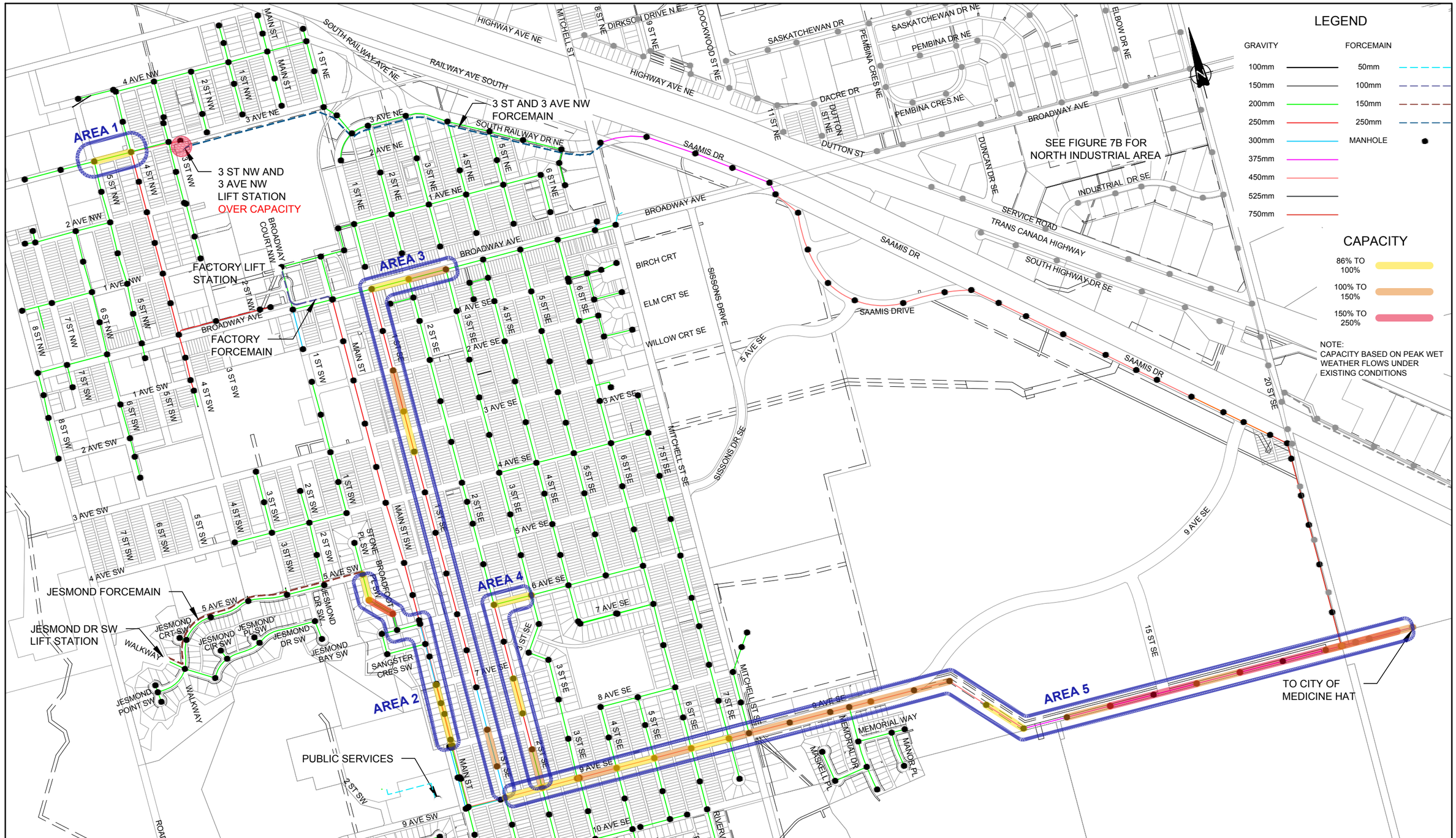


MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
FLOW MONITORING STATIONS AND
TRIBUTARY AREAS

SCALE: 1:15 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 6

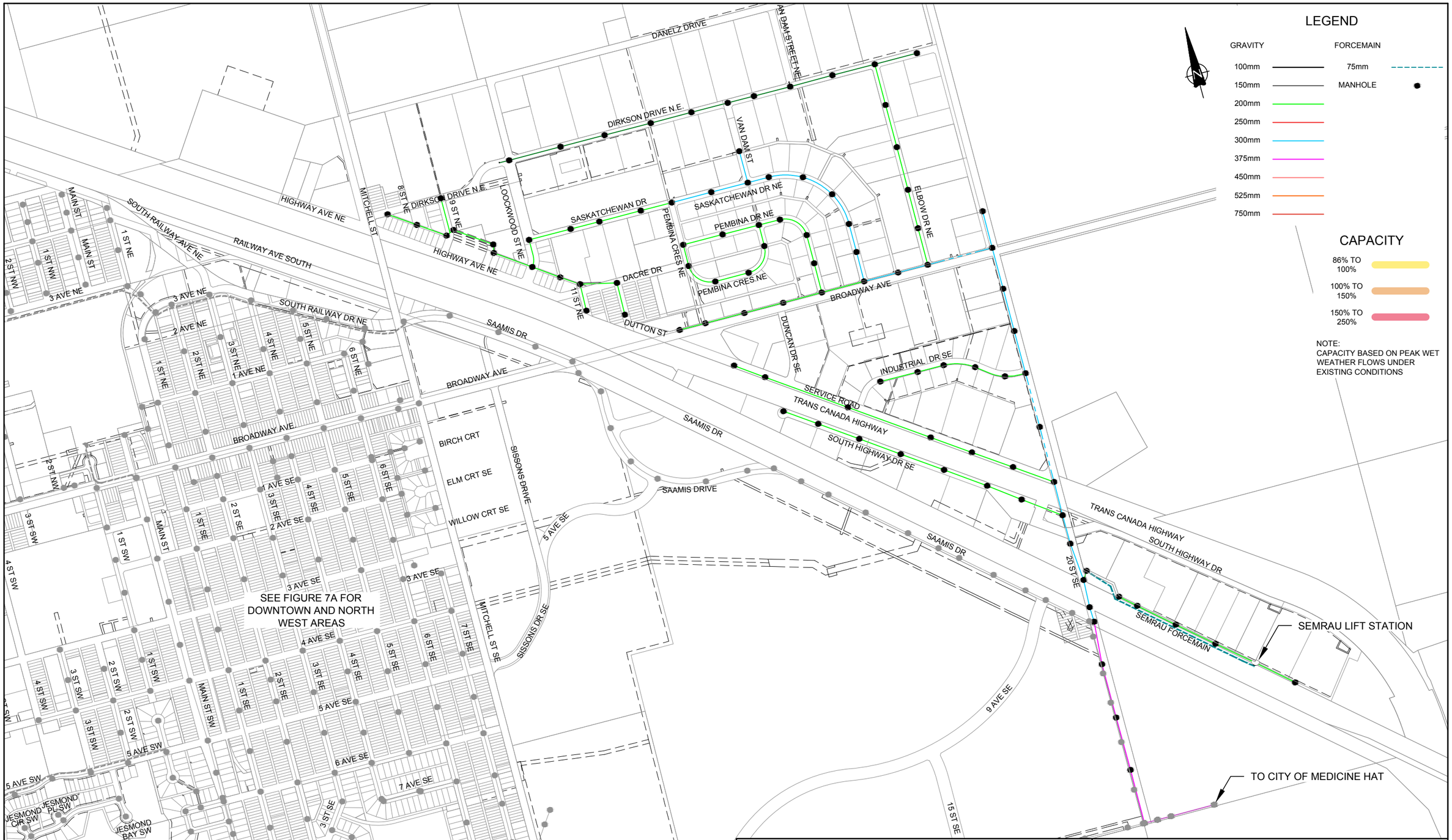


TOWN OF REDCLIFF

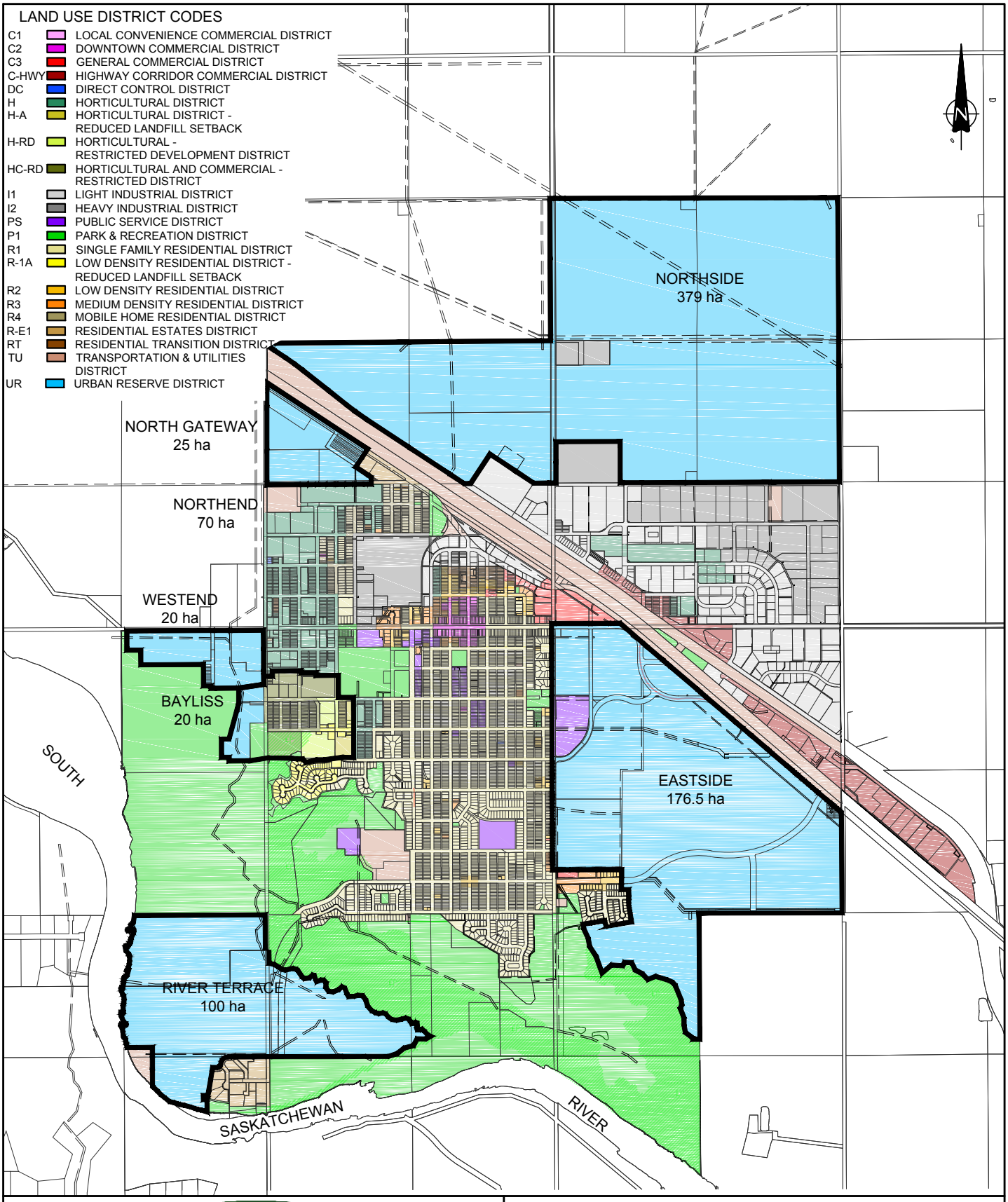
WASTEWATER SYSTEM EVALUATION
EXISTING CAPACITY CONSTRAINTS
SOUTH AND NORTH WEST TRUNK AREAS

MPE Engineering Ltd.

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 7A



MPE Engineering Ltd.		TOWN OF REDCLIFF WASTEWATER SYSTEM EVALUATION EXISTING CAPACITY CONSTRAINTS NORTH INDUSTRIAL AREA	
SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 7B

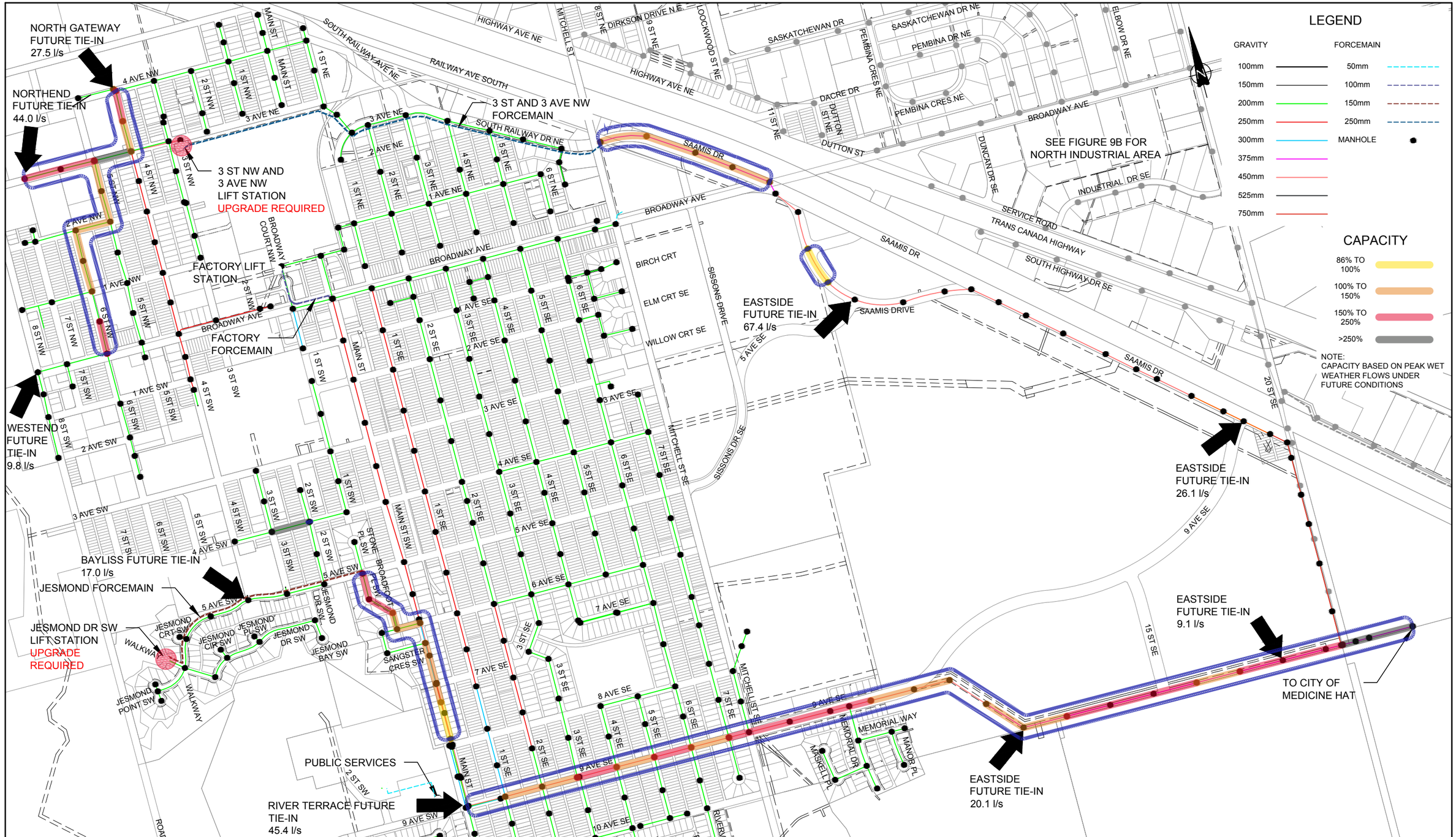


MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
LAND USE PLAN

SCALE: 1:30 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 8

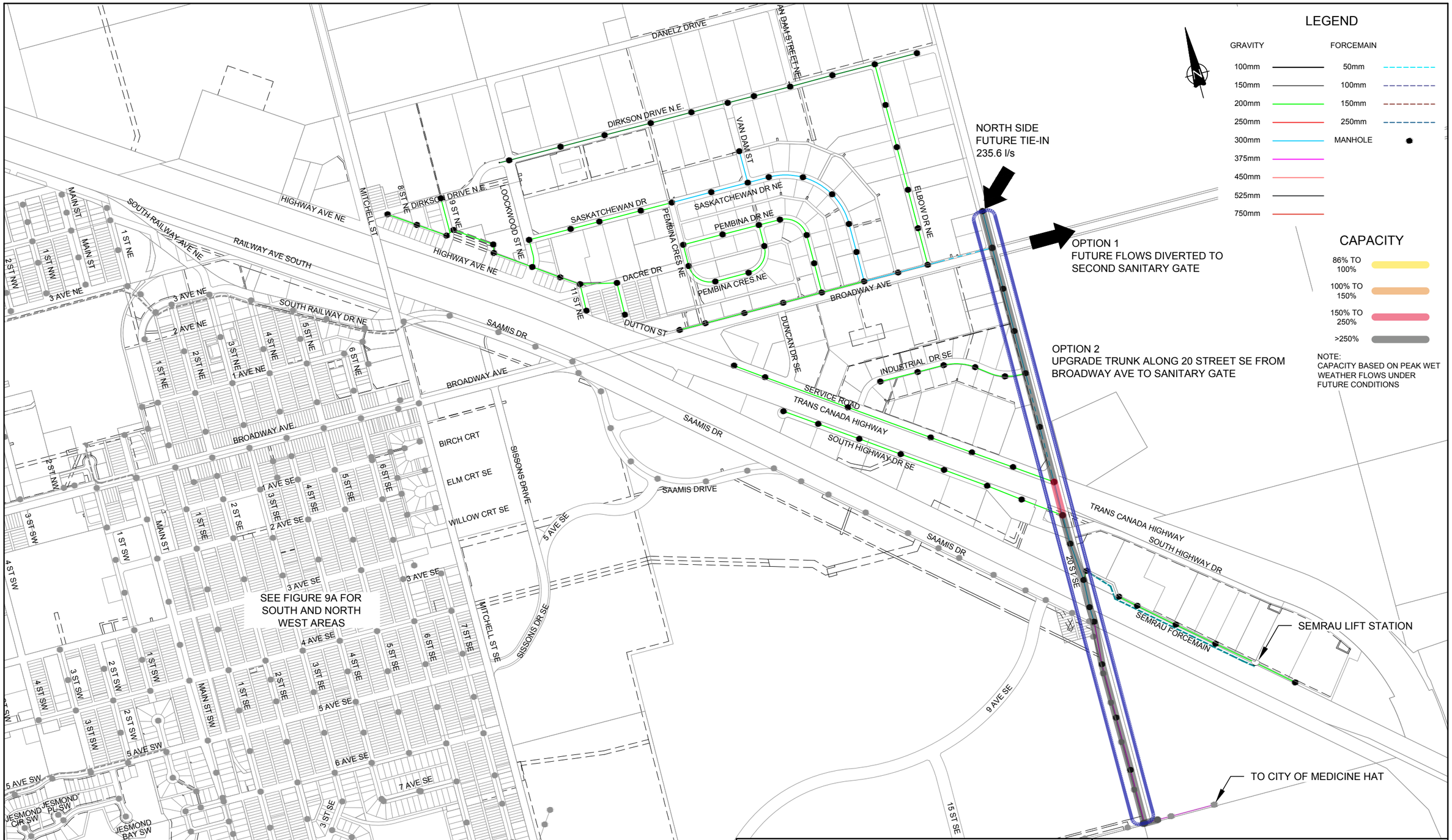


MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
FUTURE CAPACITY CONSTRAINTS
SOUTH AND NORTH WEST TRUNK AREAS

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 9A



MPE Engineering Ltd.

TOWN OF REDCLIFF

WASTEWATER SYSTEM EVALUATION
FUTURE CAPACITY CONSTRAINTS
NORTH INDUSTRIAL AREA

SCALE: 1:10 000	DATE: APRIL 2013	JOB: 3400-003-00	FIGURE: 9B

APPENDIX B

Rain Event Charts

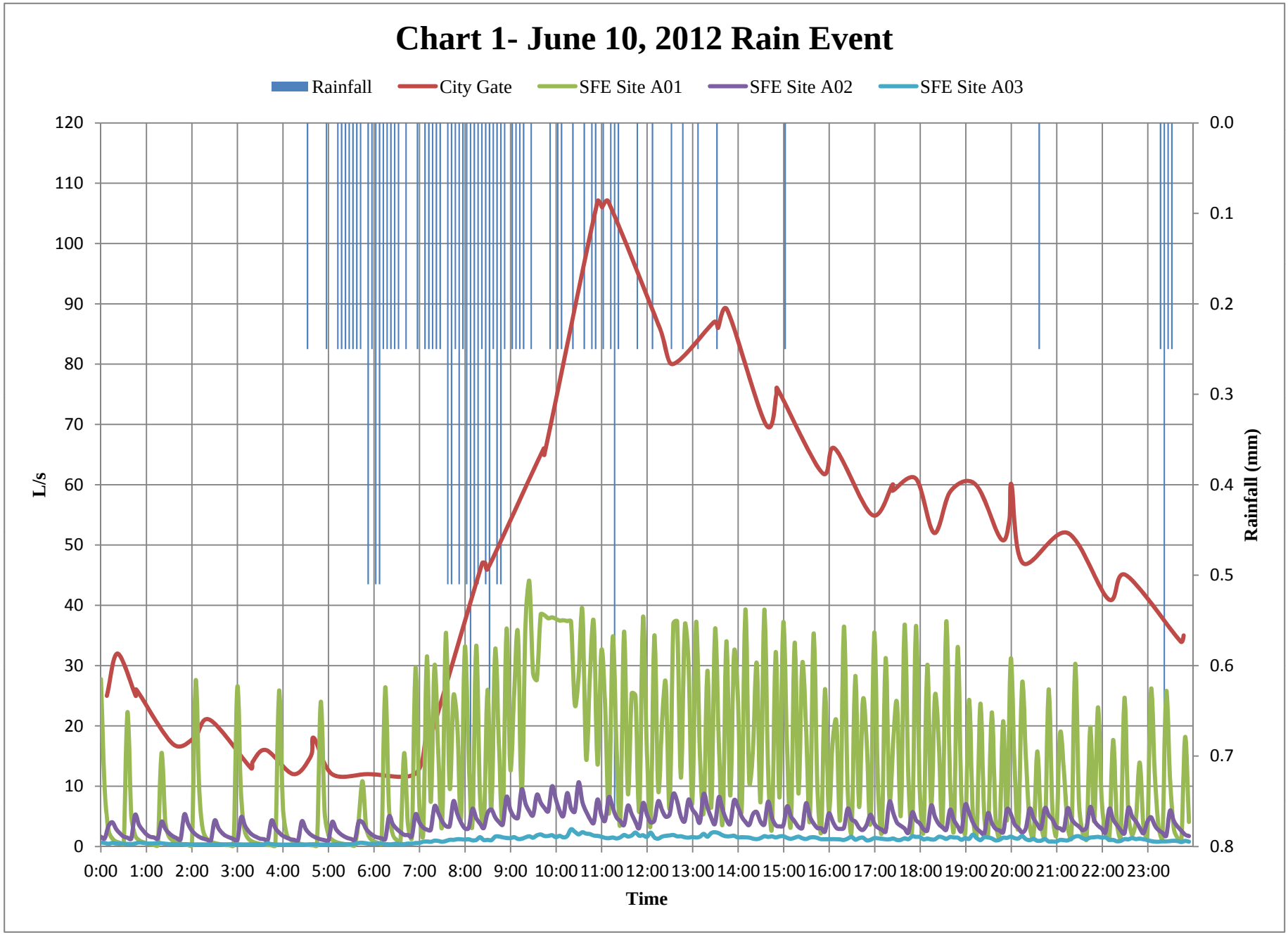


Chart 1- June 10, 2012 Rain Event
Rainfall
City Gate
SFE Site A01
SFE Site A02
SFE Site A03
L/s
Rainfall (mm)
Time
120
110
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0:00
1:00
2:00
3:00
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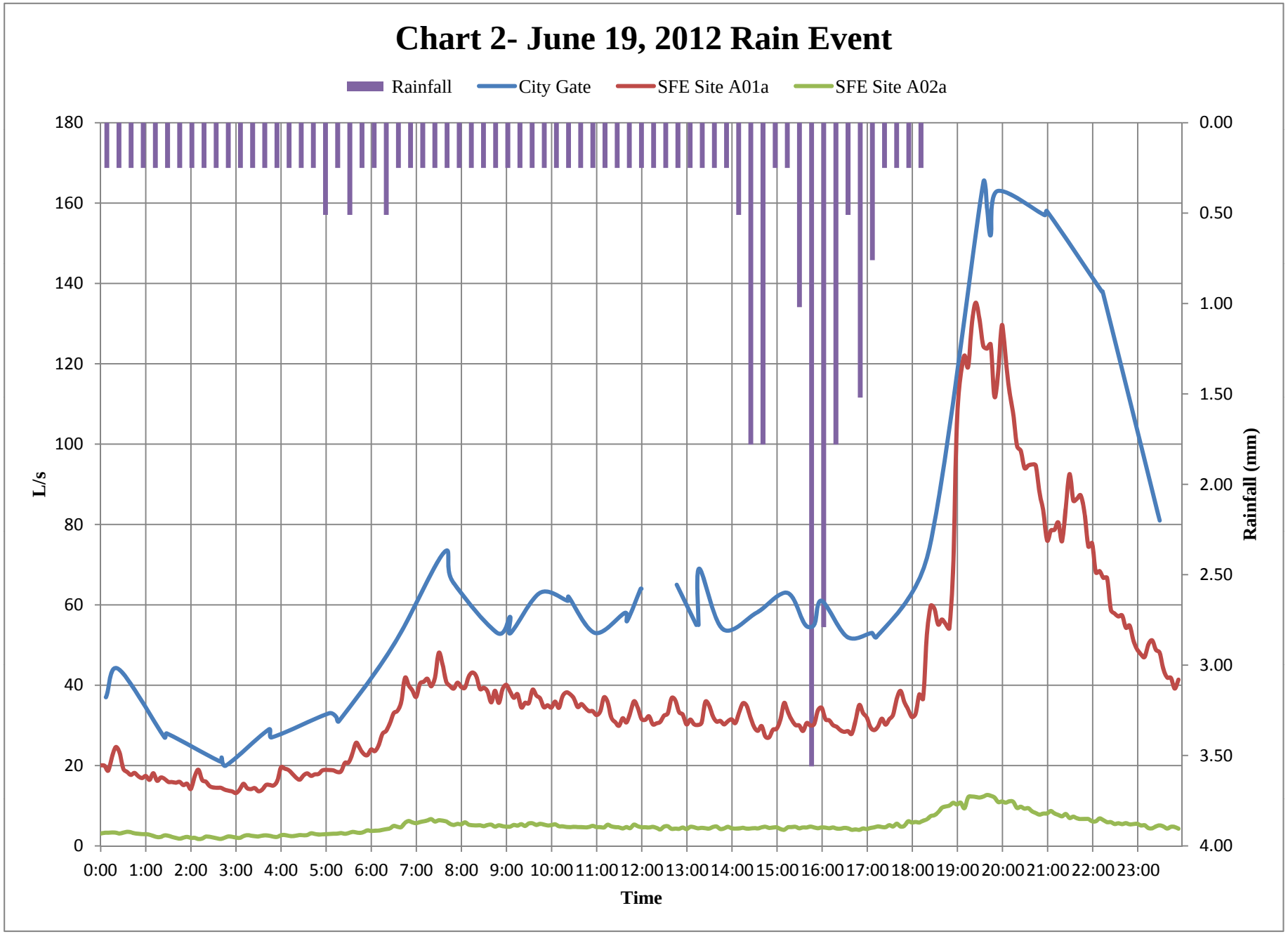
Chart 2- June 19, 2012 Rain Event
Rainfall
City Gate
SFE Site A01a
SFE Site A02a
L/s
Rainfall (mm)
Time
180
160
140
120
100
80
60
40
20
0
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
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23:00

APPENDIX C

Model Results

TOWN OF REDCLIFF - SANITARY SEWER MODEL

EXISTING CAPACITY ANALYSIS

Project: Redcliff Sanitary Waste Water Study
Client: Town of Redcliff
Job No: 3400-003-00
Date: April 22, 2013
Prepared By: Blake Smith / Patrick Boyd
Checked By:

Mannings "n" Value
PVC: 0.013
VCT: 0.015

Select the Desired Existing and Future Scenarios from the Drop Down Menus in the Scenarios Column

	Scenarios	Residential (l/cap/day)	Commercial (l/s/ha)	Horticultural (l/s/ha)	Industrial (l/s/ha)	Residential I/I (l/s/ha)	Commercial I/I (l/s/ha)	Horticultural I/I (l/s/ha)	Industrial I/I (l/s/ha)
Existing	Calibrated Peak Wet Flow	580	0.360	0.400	0.105	0.600	0.060	0.200	0.020
Future	No	0	0	N/A	0	0	0	N/A	0
Existing Manual	Enter Generation Inputs as Desired and Select Manual in the Above Drop Downs:	250	0.001	0.001	0.001	0.1	0.1	0.1	0.1
Future Manual		1	2	N/A	4	6	7	N/A	9

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

	FLOWS (l/s)
NORTH INDUSTRIAL TRUNK	26.92
NORTHWEST TRUNK	44.27
SOUTH TRUNK	161.78
TO CITY GATE	**232.97**

	North Industrial	Northwest	South	To City Gate	SUM
86-100%	0	1	12	0	13
100-150%	0	0	17	3	20
150-250%	0	0	4	0	4
>250%	0	0	0	0	0
					37

EXISTING	Residential (l/cap/day)	Commercial (l/s/ha)	Horticultural (l/s/ha)	Industrial (l/s/ha)	Residential I/I (l/s/ha)	Commercial I/I (l/s/ha)	Horticultural I/I	Industrial I/I
Calibrated Average Dry Flow	260	0.18	0.20	0.035	0.00	0.00	0.00	0.00
Calibrated Peak Dry Flow	580	0.36	0.40	0.105	0.00	0.00	0.00	0.00
Calibrated Peak Wet Flow	580	0.36	0.40	0.105	0.60	0.06	0.20	0.02
Town of Redcliff	340	0.46	0.23	0.230	0.20	0.28	0.28	0.28
MSSM / ESRD	454	0.46	0.35	0.350	0.00	0.28	0.28	0.28
Lethbridge	400	0.23	0.35	0.350	0.64	0.23	0.35	0.35
ESRD	340	0.46	0.35	0.350	0.28	0.28	0.28	0.28
RECOMMENDED	300	0.20	0.20	0.150	0.60	0.06	0.20	0.02
Manual Inputs	250	0.00	0.00	0.00	0.10	0.10	0.10	0.10
FUTURE	**Residential (l/cap/day)**	**Commercial (l/s/ha)**	**Horticultural (l/s/ha)**	**Industrial (l/s/ha)**	**Residential I/I (l/s/ha)**	**Commercial I/I (l/s/ha)**	**Horticultural I/I**	**Industrial I/I**
Recommended	300	0.20	0.20	0.150	0.16	0.10	0.10	0.10
Town of Redcliff	340	0.46	0.23	0.230	0.20	0.28	0.28	0.28
MSSM / ESRD	454	0.46	0.35	0.350	0.00	0.28	0.28	0.28
Lethbridge	400	0.23	0.35	0.350	0.16	0.09	0.09	0.09
ESRD	340	0.46	0.35	0.350	0.28	0.28	0.28	0.28
Manual Inputs	1	2.00	N/A	4.00	6.00	7.00	N/A	9.00
25% Buildout	300	0.20	0.20	0.150	0.16	0.10	0.10	0.10
50% Buildout	300	0.20	0.20	0.150	0.16	0.10	0.10	0.10
No	0	0	0	0	0	0	0	0

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	15.29	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data									
																																invert issue									
FLOWS TO FACTORY LIFT STATION NORTH OF BROADWAY	D9F0	D9A2	12.00	12.00	31.2	0.20944	1.000	0.675	**0.885**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.885**	747.195	745.734	1.39%	200	PVC	105.090	1.23	0.013	1.42	**38.672**	2%
	D9A2	D950	6.00	18.00	46.8	0.31417	1.000	1.013	**1.327**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.327**	745.734	745.221	0.49%	200	PVC	105.770	0.73	0.013	2.42	**22.842**	6%
	D951	D950	13.00	13.00	33.8	0.2269	1.000	0.732	**0.958**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.958**	747.065	745.221	1.67%	200	VCT	110.190	1.17	0.015	1.57	**36.772**	3%
	D950	D948	0.00	31.00	80.6	0.54106	1.000	1.744	**2.285**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**2.285**	745.501	745.273	0.22%	200	VCT	105.260	0.42	0.015	4.17	**13.229**	17%
	D9E0	D948	3.00	3.00	7.8	0.05236	1.000	0.169	**0.221**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.221**	745.364	745.283	0.12%	200	VCT	68.34	0.31	0.015	3.66	**9.786**	2%
	D948	D946	0.00	47.00	122.2	0.82032	1.000	2.645	**3.465**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**3.465**	745.283	744.835	0.42%	200	VCT	105.550	0.59	0.015	2.98	**18.519**	19%
	D946	D943	0.00	47.00	122.2	0.82032	1.000	2.645	**3.465**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**3.688**	744.835	744.404	0.41%	200	VCT	105.410	0.58	0.015	3.04	**18.176**	20%
	D943	D892	0	66.00	171.6	1.15194	1.000	3.714	**4.866**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**5.088**	744.364	743.943	0.40%	200	VCT	105.990	0.57	0.015	3.10	**17.915**	28%
	D94F	D948	13	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	746.792	745.293	1.38%	200	VCT	108.980	1.06	0.015	1.71	**33.337**	3%
	D945	D946	0	0	0.0	0	1.000	0.000	**0.000**	0.53	0.53	0.1908	1.000	0.032	**0.223**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.223**	747.533	745.445	1.76%	200	VCT	118.940	1.20	0.015	1.65	**37.662**	1%
	D944	D943	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	748.083	744.384	3.36%	200	VCT	109.930	1.66	0.015	1.10	**52.142**	1%
	3A3F6	D943	12	12	31.2	0.20944	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	745.903	744.384	1.32%	200	VCT	115.460	1.04	0.015	1.85	**32.604**	3%
	D893	D892	21	21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.548**	747.048	744.023	2.51%	200	VCT	120.550	1.43	0.015	1.40	**45.028**	3%
	D892	39FD5	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.933	743.826	0.24%	200	VCT	44.910	0.44	0.015	1.69	**13.875**	48%
	39FD5	39FD4	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.816	743.579	0.38%	200	VCT	62.260	0.56	0.015	1.86	**17.538**	38%
	39FD4	39FD3	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.579	743.323	0.39%	200	VCT	65.650	0.56	0.015	1.94	**17.750**	37%
	39FD3	39FD2	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.323	741.466	1.67%	200	VCT	111.200	1.17	0.015	1.59	**36.733**	18%
	DA94	39FD3	Clean out		0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	747.580	743.453	3.40%	200	VCT	121.330	1.67	0.015	1.21	**52.425**	0%
	D95E	D9BD	26	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	747.108	745.950	1.04%	300	PVC	111.810	1.39	0.013	1.34	**98.411**	2%
	D9BD	39FD2	16	42	109.2	0.73306	1.000	2.363	**3.096**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.096**	745.870	744.756	0.92%	200	VCT	120.500	0.87	0.015	2.31	**27.331**	11%
	39FD2	LS	0	129.00	335.4	2.25153	1.000	7.259	**9.511**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**9.733**	741.406	740.505	0.40%	200	VCT	222.530	0.58	0.015	6.44	**18.087**	54%
	LS	DA94	0	0.00	0.0	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**17.140**	**17.140**			0.00%	100	POLY	222.530				LS CAPACITY GOOD	
MAIN TO SOUTH	D9BD	D9C3	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	747.350	746.760	0.53%	200	VCT	111.280	0.66	0.015	2.82	**20.698**	2%
	D9C3	D963	4	11.00	28.6	0.19199	1.000	0.619	**0.811**	0.33	0.33	0.1188	1.000	0.020	**0.139**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**9.520**	746.745	746.431	0.27%	250	VCT	118.060	0.54	0.015	3.63	**26.579**	36%
	D963	D962	0	11.00	28.6	0.19199	1.000	0.619	**0.811**		0.33	0.1188	1.000	0.020	**0.139**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**9.520**	746.401	745.960	0.40%	250	VCT	110.890	0.66	0.015	2.79	**32.502**	29%
	D962	D961	0	11.00	28.6	0.19199	1.000	0.619	**0.811**	0.24	0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**9.620**	745.930	745.149	0.64%	250	VCT	122.170	0.84	0.015	2.43	**41.207**	23%
	D961	D958	10	21.00	54.6	0.36653	1.000	1.182	**1.548**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**10.358**	745.129	744.070	0.87%	250	VCT	122.150	0.98	0.015	2.08	**47.988**	22%
	D958	D957	10	31.00	80.6	0.54106	1.000	1.744	**2.285**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**11.095**	744.050	743.070	0.97%	250	VCT	101.480	1.03	0.015	1.64	**50.647**	22%
	D957	D999	20	51.00	132.6	0.89014	1.000	2.870	**3.760**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**12.569**	743.050	740.802	1.31%	250	VCT	171.860	1.20	0.015	2.39	**58.944**	21%
	D999	D965	8	59.00	153.4	1.02977	1.000	3.320	**4.350**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**13.159**	740.772	740.355	0.46%	250	VCT	90.840	0.71	0.015	2.13	**34.919**	38%
	D965	D8DC	6	65.00	169.0	1.13449	1.000	3.658	**4.792**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**13.602**	740.335	738.733	2.25%	250	VCT	71.150	1.58	0.015	0.75	**77.335**	18%
	D8DC	D8DD	5	70.00	182.0	1.22176	1.000	3.939	**5.161**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**13.970**	738.523	737.938	0.56%	450	PVC	103.570	1.35	0.013	1.28	**214.273**	7%
	D8DD	D8EA	4	74.00	192.4	1.29157	1.000	4.164	**5.456**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.265**	737.928	737.800	0.17%	450	PVC	77.240	0.73	0.013	1.76	**116.062**	12%
	D8EA	D8EC	5	79.00	205.4	1.37884	1.000	4.445	**5.824**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.634**	737.790	737.706	0.10%	450	PVC	85.180	0.56	0.013	2.52	**89.532**	16%
	D8EC	D8F3	4	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.686	737.677	0.01%	450	PVC	89.200	0.18	0.013	8.26	**28.638**	52%
	D8F3	D8EF	0	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.677	737.530	0.16%	450	PVC	93.510	0.71	0.013	2.19	**113.041**	13%
	D8EF	D8BC	0	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.510	737.409	0.13%	450	PVC	79.490	0.64	0.013	2.07	**101.627**	15%
	D8BC	D8BB	0	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.369	737.22	0.14%	450	PVC	103.81	0.68	0.013	2.55	**108.014**	14%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	15.29	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL CONTRIBUTING LOTS	RESIDENTIAL TOTAL CONTRIBUTING LOTS	RESIDENTIAL ASSUMED NUMBER OF PERSONS	RESIDENTIAL Q Average	RESIDENTIAL PEAK FACTOR	RESIDENTIAL I/I ALLOWANCE (l/s)	RESIDENTIAL FLOW (l/s)	COMMERCIAL CONTRIBUTING AREAS (ha)	COMMERCIAL TOTAL CONTRIBUTING AREAS (ha)	COMMERCIAL Q Average	COMMERCIAL PEAK FACTOR	COMMERCIAL I/I ALLOWANCE (l/s)	COMMERCIAL FLOW (l/s)	HORTICULTURAL CONTRIBUTING AREAS (ha)	HORTICULTURAL TOTAL CONTRIBUTING AREAS (ha)	HORTICULTURAL Q Average	HORTICULTURAL PEAK FACTOR	HORTICULTURAL I/I ALLOWANCE (l/s)	HORTICULTURAL FLOW (l/s)	INDUSTRIAL CONTRIBUTING AREAS (ha)	INDUSTRIAL TOTAL CONTRIBUTING AREAS (ha)	INDUSTRIAL Q Average	INDUSTRIAL PEAK FACTOR	INDUSTRIAL I/I ALLOWANCE (l/s)	INDUSTRIAL FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																															new data										
																															invert issue										
	DA94	D9C3	0	0.00	0.0	0	1.000	0.000	**0.000**		0.000	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**8.570**	746.845	746.840	0.34%	200	VCT	1.490	0.52	0.015	0.05	**16.466**	52%
	DA94	D9EA	7	7.00	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**9.086**	746.840	746.510	0.30%	200	VCT	110.160	0.50	0.015	3.71	**15.558**	58%
WEST SUBDIVISION TO JESMOND LIFT STATION	D95F	D960		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	745.503	744.858	0.69%	200	VCT	93.140	0.75	0.015	2.06	**23.655**	0%
	D960	D959		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	744.818	744.259	0.53%	200	VCT	106.070	0.66	0.015	2.69	**20.635**	0%
	D959	D95A	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	744.209	743.578	0.75%	200	VCT	84.08	0.78	0.015	1.79	**24.625**	3%
	D95A	D956	10	19	49.4	0.33162	1.000	1.069	**1.401**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.401**	743.578	742.659	1.04%	200	VCT	88.11	0.92	0.015	1.59	**29.030**	5%
	D956	D955	2	21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.548**	742.679	740.329	2.24%	200	VCT	105.1	1.35	0.015	1.29	**42.505**	4%
	D99A	D95B		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.34	1.34	0.536	1.000	0.268	**0.804**		0	0	1.000	0.000	**0.000**			**0.804**	741.133	740.689	0.51%	200	VCT	86.47	0.65	0.015	2.22	**20.369**	4%
	D95B	D95C		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		1.34	0.536	1.000	0.268	**0.804**		0	0	1.000	0.000	**0.000**			**0.804**	740.719	740.323	0.46%	200	VCT	85.99	0.61	0.015	2.33	**19.290**	4%
	D954	D95C		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.13	1.13	0.452	1.000	0.226	**0.678**		0	0	1.000	0.000	**0.000**			**0.678**	740.740	740.303	0.41%	200	VCT	105.39	0.58	0.015	3.01	**18.304**	4%
	D95C	D955		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		2.47	0.988	1.000	0.494	**1.482**		0	0	1.000	0.000	**0.000**			**1.482**	740.363	740.319	0.04%	200	VCT	105.84	0.18	0.015	9.56	**5.796**	26%
	D99B	D955		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	0.82	0.82	0.328	1.000	0.164	**0.492**		0	0	1.000	0.000	**0.000**			**0.492**	742.511	740.349	2.39%	200	PVC	90.33	1.62	0.013	0.93	**50.742**	1%
	D955	290AB		21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**	1.25	4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**4.272**	740.259	739.286	1.08%	200	PVC	90.47	1.08	0.013	1.39	**34.014**	13%
	290AB	D9F1		21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**4.272**	739.276	738.807	0.55%	200	PVC	84.93	0.78	0.013	1.82	**24.373**	18%
	D9F1	DA02	5	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**4.641**	738.820	738.390	0.41%	200	PVC	105.45	0.67	0.013	2.64	**20.944**	22%
	DA02	DA01	6	32	83.2	0.55852	1.000	1.801	**2.359**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**5.083**	738.360	737.960	0.38%	200	PVC	106.39	0.64	0.013	2.77	**20.111**	25%
	DA01	DA00	7	39	101.4	0.68069	1.000	2.195	**2.875**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**5.599**	737.930	737.440	0.42%	200	PVC	115.53	0.68	0.013	2.83	**21.360**	26%
	Future	DA02																										**0.000**													
	DA00	D9FF	7	46	119.6	0.80287	1.000	2.588	**3.391**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**	**0.000**		**6.115**	737.414	736.540	0.92%	200	PVC	94.67	1.00	0.013	1.57	**31.514**	19%
	D9FF	F9F9	6	57	148.2	0.99486	1.000	3.207	**4.202**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**	**0.000**		**6.926**	736.500	735.420	1.35%	200	PVC	79.77	1.21	0.013	1.09	**38.163**	18%
	D9FE	D9FF	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	736.740	736.560	0.94%	200	PVC	19.21	1.01	0.013	0.32	**31.749**	1%
	D9FB	D9FA	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	736.270	736.080	0.94%	200	PVC	20.24	1.01	0.013	0.33	**31.778**	1%
	D9FC	D9FA	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	736.362	736.080	1.01%	200	PVC	27.87	1.05	0.013	0.44	**32.992**	1%
	D9FA	D9F9	8	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	736.020	735.420	0.58%	200	PVC	102.66	0.80	0.013	2.14	**25.074**	5%
	D9F3	D9F2	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	738.211	737.910	0.58%	200	PVC	52.29	0.79	0.013	1.10	**24.884**	1%
	D9F2	D9F4	11	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	737.850	737.170	0.41%	200	PVC	166.63	0.67	0.013	4.16	**20.952**	6%
	D9F4	D9F7	4	25	65.0	0.43634	1.000	1.407	**1.843**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.843**	737.138	736.750	0.39%	200	PVC	99.66	0.65	0.013	2.55	**20.465**	9%
	D9F7	D9F8	4	37	96.2	0.64579	1.000	2.082	**2.728**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.728**	736.720	736.510	0.33%	200	PVC	63.07	0.60	0.013	1.74	**18.926**	14%
	D9F8	D9F9	2	39	101.4	0.68069	1.000	2.195	**2.875**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.875**	736.452	735.560	1.03%	200	PVC	86.73	1.06	0.013	1.37	**33.262**	9%
	D9F5	D9F4	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	737.800	737.600	0.98%	200	PVC	20.39	1.03	0.013	0.33	**32.483**	1%
	D9F6	D9F7	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	737.261	737.010	0.88%	200	PVC	28.41	0.98	0.013	0.48	**30.829**	2%
	D9F9	DEF2	1	113	293.8	1.97227	1.000	6.359	**8.331**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**	**0.000**		**11.055**	735.370	734.540	1.04%	200	PVC	79.77	1.06	0.013	1.25	**33.456**	33%
	DEF2	D966	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**15.290**	**0.000**				150	PVC	664.69		0.013		LS CAPACITY GOOD	

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL			Existing Duty Point (Measured from Drawdown Tests)		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	Factory LS Flow 1 (50%)	17.14	l/s
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha	Factory LS Flow 2 (50%)		
Population:	5600										Jesmond LS	15.29	l/s
Residential I/I (l/s/ha)	0.6										Redcliff Way LS	15.64	l/s
Current Residential Area (ha)	202												

MANNINGS "n" VALUE		
PVC	0.013	
VCT	0.015	

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
JESMOND LS TO TRUNK MAIN	D95D	D966	14	14	36.4	0.24435	1.000	0.788	1.032		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.032	740.440	740.100	0.38%	200	PVC	88.93	0.65	0.013	2.30	20.280	5%
	D966	D964	6	20	52.0	0.34907	1.000	1.125	1.475		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	16.765	740.060	739.820	0.33%	200	PVC	72.71	0.60	0.013	2.02	18.844	89%
	D964	D99D	6	26	67.6	0.4538	1.000	1.463	1.917		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	17.207	739.700	739.583	0.16%	200	PVC	74.63	0.41	0.013	3.01	12.986	132%
	D99D	D969	2	28	72.8	0.4887	1.000	1.576	2.064		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	17.354	739.533	739.262	0.59%	200	PVC	46.17	0.80	0.013	0.96	25.128	69%
	D969	D8DB	2	32	83.2	0.55852	1.000	1.801	2.359		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	17.649	739.242	738.800	0.68%	200	PVC	65.06	0.86	0.013	1.26	27.034	65%
	D8DB	D8DE	0	33	85.8	0.57597	1.000	1.857	2.433		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	17.723	738.760	738.492	0.47%	300	VCT	56.7	0.82	0.015	1.16	57.618	31%
	D8DE	13770	6	48	124.8	0.83778	1.000	2.701	3.539		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	18.829	738.612	738.344	0.23%	300	VCT	115.92	0.57	0.015	3.39	40.297	47%
	13770	D8EB	4	52	135.2	0.90759	1.000	2.926	3.834		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	19.124	738.344	738.251	0.18%	250	VCT	51.29	0.45	0.015	1.91	21.946	87%
	D8EB	D8F0	6	58	150.8	1.01231	1.000	3.264	4.276		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	19.566	738.231	738.039	0.19%	250	VCT	103.28	0.45	0.015	3.80	22.222	88%
	D8F0	D8F1	2	60	156.0	1.04722	1.000	3.376	4.424		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	19.714	738.019	737.979	0.21%	250	VCT	19	0.48	0.015	0.66	23.647	83%
	D8F1	D8ED	2	62	161.2	1.08213	1.000	3.489	4.571		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	19.861	737.979	737.774	0.23%	300	VCT	87.85	0.57	0.015	2.56	40.484	49%
	D8ED	D8BE	2	64	166.4	1.11704	1.000	3.601	4.718		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	20.008	737.774	737.539	0.27%	300	VCT	87.95	0.61	0.015	2.39	43.321	46%
	D8BE	D8BA	2	66	171.6	1.15194	1.000	3.714	4.866		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	20.156	737.579	737.450	0.13%	300	VCT	98.57	0.43	0.015	3.83	30.318	66%
	D8BA	D8BB	1	67	174.2	1.1694	1.000	3.770	4.940		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.290	20.230	737.350	737.180	1.27%	300	VCT	13.39	1.34	0.015	0.17	94.431	21%
	D8DC	D8DB	1	1	2.6	0.01745	1.000	0.056	0.074		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.074	738.710	738.523	1.78%	300	VCT	10.48	1.58	0.015	0.11	111.949	0%
	D96A	D969	2	2	5.2	0.03491	1.000	0.113	0.147		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.147	739.432	739.252	0.42%	200	PVC	42.89	0.68	0.013	1.06	21.248	1%
	D96A	D96B	3	3	7.8	0.05236	1.000	0.169	0.221		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.221	739.592	739.172	0.73%	200	PVC	57.38	0.89	0.013	1.07	28.061	1%
	D96B	D8DE	6	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	739.162	738.582	0.54%	200	PVC	107.75	0.77	0.013	2.34	24.063	3%
SW SUB TO TRUNK	D8F2	D8EE	5	5	13.0	0.08727	1.000	0.281	0.369		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.369	738.363	737.952	0.49%	200	VCT	83.49	0.63	0.015	2.19	19.944	2%
	D8EE	D8BD	5	10	26.0	0.17454	1.000	0.563	0.737		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.737	737.932	737.720	0.25%	200	VCT	86.02	0.45	0.015	3.19	14.112	5%
	D8BD	D8BB	1	52	135.2	0.90759	1.000	2.926	3.834		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	3.834	737.660	737.150	0.48%	200	VCT	106.49	0.63	0.015	2.83	19.671	19%
	D9A8	D9A9	4	4	10.4	0.06981	1.000	0.225	0.295		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	0.295	740.169	739.919	0.49%	200	PVC	50.79	0.73	0.013	1.16	23.011	1%
	D9A9	D8C1	3	20	52.0	0.34907	1.000	1.125	1.475		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	1.475	739.899	739.528	0.40%	200	PVC	93.18	0.66	0.013	2.36	20.696	7%
	D8C1	D8C0	1	21	54.6	0.36653	1.000	1.182	1.548		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	1.548	739.448	739.267	0.86%	200	PVC	20.98	0.97	0.013	0.36	30.464	5%
	D8C0	D8BF	10	31	80.6	0.54106	1.000	1.744	2.285		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	2.285	739.097	738.486	0.80%	200	VCT	76.16	0.81	0.015	1.57	25.460	9%
	D8BF	D8BD	10	41	106.6	0.7156	1.000	2.307	3.023		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	3.023	738.446	737.850	0.78%	200	VCT	76.1	0.80	0.015	1.58	25.156	12%
	D9A5	D9A9	13	13	33.8	0.2269	1.000	0.732	0.958		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.958	740.407	739.939	0.40%	200	PVC	116.05	0.66	0.013	2.92	20.828	5%
Redcliff Way LS	EAF2	EAF3	7	7	18.2	0.12218	1.000	0.394	0.516		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.516	736.539	736.489	0.47%	200	PVC	10.7	0.71	0.013	0.25	22.421	2%
	EAF3	EAF8	17	24	62.4	0.41889	1.000	1.351	1.769		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.769	736.490	735.970	0.32%	250	PVC	163.69	0.68	0.013	4.00	33.517	5%
	EAF8	EAFA	7	31	80.6	0.54106	1.000	1.744	2.285		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.285	735.970	735.782	0.28%	250	PVC	67.77	0.64	0.013	1.77	31.321	7%
	EAFA	160C7	0	91	236.6	1.58829	1.000	5.121	6.709		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			6.709	735.782	735.550	2.00%	200	PVC	11.61	1.48	0.013	0.13	46.364	14%
	160C7	D9A8	0	0	0.0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640					150	PVC	245.93		0.013		LS CAPACITY GOOD	
	D9A8	D9A7	12	12	31.2	0.20944	1.000	0.675	0.885		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.885	740.189	738.074	2.48%	200	PVC	85.31	1.64	0.013	0.86	51.643	2%
	D9A7	D9AA	5	37	96.2	0.64579	1.000	2.082	2.728		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.728	738.024	737.323	0.72%	200	PVC	97.47	0.89	0.013	1.83	27.815	10%
	D9AA	EAFA	6	60	156.0	1.04722	1.000	3.376	4.424		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.424	736.123	735.782	0.61%	200	PVC	56.22	0.81	0.013	1.15	25.544	17%
	D9AC	D9AB	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	736.720	736.441	0.37%	200	PVC	76.12	0.63	0.013	2.01	19.857	3%
	D9AB	D9AA	8	17	44.2	0.29671	1.000	0.957	1.253		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.253	736.401	736.153	0.33%	200	PVC	76.29	0.60	0.013	2.14	18.700	7%
	D9A5	D9A6	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	740.437	739.267	0.86%	200	PVC	135.49	0.97	0.013	2.33	30.478	2%
	D9A6	D9A7	11	20	52.0	0.34907	1.000	1.125	1.475		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.475	739.247	738.064	1.04%	200	PVC	114.28	1.06	0.013	1.79	33.370	4%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	15.29	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
IST SE TO SOUTH	D9EA	D974	4	179	465.4	3.12421	1.000	10.073	**13.197**	0.39	6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**24.354**	746.510	746.117	0.33%	250	VCT	118.66	0.60	0.015	3.27	**29.660**	82%
	D974	D977	13	192	499.2	3.35111	1.000	10.804	**14.155**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**25.312**	746.107	745.735	0.33%	250	VCT	111.59	0.61	0.015	3.07	**29.757**	85%
	D977	D978	13	205	533.0	3.57801	1.000	11.536	**15.114**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**26.271**	745.725	745.429	0.26%	250	VCT	115.55	0.53	0.015	3.62	**26.085**	101%
	D978	D968	12	217	564.2	3.78745	1.000	12.211	**15.998**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**27.156**	745.409	745.092	0.28%	250	VCT	113.67	0.55	0.015	3.42	**27.217**	100%
	D968	D967	13	230	598.0	4.01435	1.000	12.942	**16.957**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**28.114**	745.092	744.568	0.46%	250	VCT	115.12	0.71	0.015	2.71	**34.771**	81%
	D967	D97A	14	244	634.4	4.2587	1.000	13.730	**17.989**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**29.146**	744.518	742.589	1.69%	250	VCT	114.31	1.36	0.015	1.40	**66.951**	44%
	D97A	D979	12	256	665.6	4.46815	1.000	14.405	**18.874**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**30.031**	742.579	740.971	1.40%	250	VCT	115.09	1.24	0.015	1.55	**60.919**	49%
	D979	D8DA	11	267	694.2	4.66014	1.000	15.024	**19.685**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**30.842**	740.991	739.662	1.15%	250	VCT	115.08	1.13	0.015	1.70	**55.385**	56%
	D8DA	D8E1	10	277	720.2	4.83468	1.000	15.587	**20.422**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**31.579**	739.672	738.594	1.06%	250	VCT	101.93	1.08	0.015	1.57	**53.002**	60%
	D8E1	D8E0	10	287	746.2	5.00921	1.000	16.150	**21.159**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**32.316**	738.594	737.930	0.63%	250	VCT	104.68	0.84	0.015	2.09	**41.047**	79%
	D8E0	D8DF	17	304	790.4	5.30593	1.000	17.107	**22.412**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**33.570**	737.930	737.648	0.24%	300	VCT	119.77	0.58	0.015	3.47	**40.666**	83%
	D8DF	D8C4	10	314	816.4	5.48046	1.000	17.669	**23.150**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**34.307**	737.638	737.517	0.12%	300	VCT	103.63	0.41	0.015	4.26	**28.637**	120%
	D8C4	D8BB	10	324	842.4	5.655	1.000	18.232	**23.887**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**35.044**	737.507	737.180	0.37%	300	VCT	88.43	0.72	0.015	2.04	**50.963**	69%
BROADWAY TO WEST	398BA	398B7	4	4	10.4	0.06981	1.000	0.225	**0.295**	3.23	3.23	1.1628	1.000	0.194	**1.357**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.652**	749.080	748.890	0.33%	200	PVC	58.32	0.60	0.013	1.63	**18.721**	9%
	398B7	398B5	6	10	26.0	0.17454	1.000	0.563	**0.737**	0.39	3.62	1.3032	1.000	0.217	**1.520**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.258**	748.890	748.470	0.40%	200	PVC	105.47	0.66	0.013	2.67	**20.697**	11%
	398B5	398B3	10	75	195.0	1.30903	1.000	4.220	**5.529**		3.62	1.3032	1.000	0.217	**1.520**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**7.050**	748.470	748.230	0.23%	200	PVC	105.58	0.50	0.013	3.54	**15.638**	45%
	398B3	398B1	10	117	304.2	2.04208	1.000	6.584	**8.626**		3.62	1.3032	1.000	0.217	**1.520**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**10.146**	748.230	747.580	0.62%	200	PVC	105.23	0.82	0.013	2.14	**25.777**	39%
	398B1	D9EE	0	146	379.6	2.54824	1.000	8.216	**10.764**	0.68	4.3	1.548	1.000	0.258	**1.806**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**12.570**	747.580	747.080	0.47%	200	VCT	105.5	0.62	0.015	2.82	**19.569**	64%
	D9EE	D9EF	0	159	413.4	2.77514	1.000	8.947	**11.722**	0.71	5.43	1.9548	1.000	0.326	**2.281**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**14.003**	747.020	746.810	0.20%	200	VCT	105.09	0.40	0.015	4.33	**12.707**	110%
	D9EF	D9EA	0	168	436.8	2.93222	1.000	9.454	**12.386**	0	5.77	2.0772	1.000	0.346	**2.423**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**14.809**	746.830	746.460	0.35%	200	VCT	104.73	0.54	0.015	3.25	**16.895**	88%
2 ST SE TO NORTH	D935	D934	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	748.774	748.275	0.45%	200	VCT	110.29	0.61	0.015	3.02	**19.120**	2%
	D934	D933	3	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	748.275	748.036	0.36%	200	VCT	66.14	0.54	0.015	2.03	**17.087**	4%
	D933	D9EF	0	9	23.4	0.15708	1.000	0.506	**0.664**		0.34	0.1224	1.000	0.020	**0.143**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.806**	748.036	746.990	2.01%	200	VCT	52.01	1.28	0.015	0.68	**40.311**	2%
	EC4F	D933	0	0	0.0	0	1.000	0.000	**0.000**	0.34	0.34	0.1224	1.000	0.020	**0.143**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.143**	748.760	748.076	1.04%	200	VCT	65.68	0.92	0.015	1.19	**29.008**	0%
3 ST SE TO N	D930	D931	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	749.933	749.522	0.39%	200	VCT	106.45	0.56	0.015	3.16	**17.663**	3%
	D931	D932	6	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	749.382	748.756	0.46%	200	VCT	137.23	0.61	0.015	3.74	**19.199**	5%
	D932	D9EE	0	13	33.8	0.2269	1.000	0.732	**0.958**	0.42	0.42	0.1512	1.000	0.025	**0.176**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.135**	748.746	747.310	1.22%	200	VCT	117.76	1.00	0.015	1.96	**31.389**	4%
4 ST TO N	D90D	D90E	12	12	31.2	0.20944	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	751.736	751.051	0.60%	200	VCT	113.38	0.70	0.015	2.69	**22.094**	4%
	D90E	DA7A	11	23	59.8	0.40144	1.000	1.294	**1.696**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.696**	751.051	748.423	2.33%	200	VCT	112.94	1.38	0.015	1.36	**43.360**	4%
	DA7A	DA79	6	29	75.4	0.50616	1.000	1.632	**2.138**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.138**	748.413	748.256	0.24%	200	VCT	66.48	0.44	0.015	2.52	**13.814**	15%
	DA79	398B1	0	29	75.4	0.50616	1.000	1.632	**2.138**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.138**	748.256	747.580	1.31%	200	VCT	51.8	1.03	0.015	0.84	**32.472**	7%
	EC48	EC4C	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	749.150	748.440	1.53%	200	VCT	46.34	1.12	0.015	0.69	**35.185**	0%
	EC4C	DA79	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	748.400	748.276	0.24%	200	VCT	52.25	0.44	0.015	1.98	**13.848**	0%
5 ST TO N	D928	D929	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	753.550	752.569	1.13%	200	VCT	86.82	0.96	0.015	1.50	**30.216**	2%
	D929	D92A	8	15	39.0	0.26181	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.106**	752.569	751.841	0.85%	200	VCT	85.82	0.83	0.015	1.72	**26.180**	4%
	D92A	D92B	11	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	751.841	750.141	1.52%	200	VCT	112	1.11	0.015	1.67	**35.020**	5%
	D92B	398B3	6	32	83.2	0.55852	1.000	1.801	**2.359**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.359**	750.141	748.230	1.62%	200	VCT	118.28	1.15	0.015	1.71	**36.131**	7%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL			Existing Duty Point (Measured from Drawdown Tests)	
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	Factory LS Flow 1 (50%)	17.14 l/s
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha	Factory LS Flow 2 (50%)	
Population:	5600										Jesmond LS	15.29 l/s
Residential I/I (l/s/ha)	0.6										Redcliff Way LS	15.64 l/s
Current Residential Area (ha)	202											

MANNINGS "n" VALUE
PVC 0.013
VCT 0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
6 ST TO N	D922	D923	6	6	15.6	0.10472	1.000	0.338	0.442		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.442	755.487	754.894	0.53%	200	VCT	111	0.66	0.015	2.80	20.776	2%
	D923	D924	9	15	39.0	0.26181	1.000	0.844	1.106		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.106	754.894	753.231	1.44%	200	VCT	115.32	1.09	0.015	1.77	34.135	3%
	D924	D925	8	33	85.8	0.57597	1.000	1.857	2.433		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.433	753.231	750.508	2.46%	200	VCT	110.49	1.42	0.015	1.30	44.624	5%
	D925	D926	0	33	85.8	0.57597	1.000	1.857	2.433		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.433	750.508	750.226	3.11%	200	VCT	9.07	1.60	0.015	0.09	50.122	5%
	D926	398B5	3	55	143.0	0.95995	1.000	3.095	4.055		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.055	750.226	748.470	1.60%	200	VCT	109.93	1.14	0.015	1.60	35.926	11%
	D993	D994	8	8	20.8	0.13963	1.000	0.450	0.590		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.590	756.208	755.626	0.73%	200	VCT	79.59	0.77	0.015	1.71	24.307	2%
	D994	D995	2	10	26.0	0.17454	1.000	0.563	0.737		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.737	755.626	754.329	2.18%	200	VCT	59.42	1.34	0.015	0.74	41.996	2%
	D995	D924	0	10	26.0	0.17454	1.000	0.563	0.737		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.737	754.329	753.231	2.01%	200	VCT	54.6	1.28	0.015	0.71	40.310	2%
	D997	D996	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	752.785	752.127	0.84%	200	VCT	78.15	0.83	0.015	1.57	26.083	3%
	D996	D998	5	14	36.4	0.24435	1.000	0.788	1.032		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.032	752.127	750.679	1.95%	200	VCT	74.16	1.26	0.015	0.98	39.720	3%
	D91F	D91E	3	3	7.8	0.05236	1.000	0.169	0.221		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.221	751.316	750.956	0.79%	200	VCT	45.65	0.80	0.015	0.95	25.243	1%
	D91E	D998	2	5	13.0	0.08727	1.000	0.281	0.369		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.369	750.956	750.679	0.70%	200	VCT	39.59	0.76	0.015	0.87	23.777	2%
	D998	D926	0	19	49.4	0.33162	1.000	1.069	1.401		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.401	750.679	750.226	0.83%	200	VCT	54.41	0.83	0.015	1.10	25.937	5%
	Future	D8BB																											0.000													
9 AVE SE TO EAST	D8BB	D8B9	0	545.00	1417.0	9.51227	1.000	30.668	40.180		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	91.077	737.020	736.835	0.18%	450	VCT	104.56	0.65	0.015	2.67	103.935	88%
	D8B9	D8CE	0	894.00	2324.4	15.6036	1.000	50.307	65.910		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	116.807	736.835	736.600	0.24%	450	VCT	99.32	0.76	0.015	2.19	120.192	97%
	D8CE	D8CF	0	949.00	2467.4	16.5636	1.000	53.402	69.965		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	120.862	736.600	736.587	0.21%	450	VCT	6.06	0.72	0.015	0.14	114.444	106%
	D8CF	D8B8	0	970.00	2522.0	16.9301	1.000	54.583	71.513		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	122.410	736.567	736.400	0.16%	450	VCT	105.4	0.62	0.015	2.84	98.355	124%
	D8B8	D8A0	0	1047.00	2722.2	18.274	1.000	58.916	77.190		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	128.087	736.400	736.110	0.27%	450	VCT	106.56	0.81	0.015	2.19	128.902	99%
	D8A0	D8A3	0	1095.00	2847.0	19.1118	1.000	61.617	80.729		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	131.626	736.110	735.940	0.16%	450	VCT	104.31	0.63	0.015	2.77	99.752	132%
	D8A3	D89F	0	1272.00	3307.2	22.2011	1.000	71.577	93.778		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	144.675	735.920	735.490	0.40%	450	VCT	106.69	0.99	0.015	1.80	156.867	92%
	D89F	D89E	0	1383.00	3595.8	24.1385	1.000	77.823	101.962		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	152.858	735.490	735.390	0.18%	450	VCT	56.66	0.65	0.015	1.45	103.806	147%
	D89E	D91C	0	1389.00	3611.4	24.2432	1.000	78.161	102.404		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	153.301	734.520	734.285	0.20%	450	VCT	115.14	0.70	0.015	2.73	111.630	137%
	D91C	D91D	5	1394.00	3624.4	24.3305	1.000	78.442	102.773		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	0.000	48.070	153.669	734.275	733.951	0.28%	450	VCT	114.57	0.83	0.015	2.31	131.400	117%
	D91D	DA0E	13	1500	3900.0	26.1806	1.000	84.407	110.588		6.73	2.4228	1.000	0.404	2.827		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000	0.000	48.070	161.484	733.941	733.598	0.30%	450	VCT	114.52	0.85	0.015	2.24	135.228	119%
2 ST TO SOUTH	D935	D99C	7	7	18.2	0.12218	1.000	0.394	0.516		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.516	748.754	748.290	0.40%	200	VCT	116.37	0.57	0.015	3.39	17.949	3%
	D99C	D936	9	16	41.6	0.27926	1.000	0.900	1.180		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.180	748.280	747.198	0.94%	200	VCT	115.27	0.88	0.015	2.19	27.540	4%
	D936	D937	14	30	78.0	0.52361	1.000	1.688	2.212		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.212	747.188	745.505	1.46%	200	VCT	115.27	1.09	0.015	1.76	34.347	6%
	D937	DA7B	5	35	91.0	0.61088	1.000	1.970	2.580		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.580	745.495	743.703	3.32%	200	VCT	54.01	1.65	0.015	0.55	51.777	5%
	DA7B	D97B	9	44	114.4	0.76796	1.000	2.476	3.244		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			3.244	743.668	743.598	0.11%	200	VCT	61.61	0.30	0.015	3.37	9.581	34%
	D97B	D975	12	56	145.6	0.97741	1.000	3.151	4.129		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.129	743.558	741.343	1.93%	200	VCT	114.61	1.26	0.015	1.52	39.517	10%
	D975	D8D9	14	70	182.0	1.22176	1.000	3.939	5.161		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			5.161	741.333	740.077	1.09%	200	VCT	114.88	0.95	0.015	2.02	29.722	17%
	D8D9	D8E7	10	290	754.0	5.06157	1.000	16.319	21.380		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			21.380	740.087	738.656	1.37%	250	VCT	104.11	1.23	0.015	1.41	60.423	35%
	D8E7	D8E6	6	296	769.6	5.1663	1.000	16.656	21.823		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			21.823	738.656	738.039	0.59%	250	VCT	104.18	0.81	0.015	2.15	39.663	55%
	D8E6	D8E5	14	310	806.0	5.41065	1.000	17.444	22.855		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			22.855	738.039	737.825	0.22%	250	VCT	98.51	0.49	0.015	3.36	24.021	95%
	D8E5	D8C5	8	318	826.8	5.55028	1.000	17.894	23.445		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			23.445	737.825	737.460	0.36%	250	VCT	101.82	0.63	0.015	2.70	30.858	76%
	D8C5	D8B9	14	332	863.2	5.79463	1.000	18.682	24.477		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			24.477	737.460	736.835	0.58%	200	VCT	108.05	0.69	0.015	2.62	21.619	113%
3 ST TO SOUTH	D930	D92F	4	4	10.4	0.06981	1.000	0.225	0.295		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.295	750.163	749.473	0.65%	200	VCT	106.26	0.73	0.015	2.43	22.906	1%
	D92F	D92E	5	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	749.453	747.61	1.72%	200	VCT	106.86	1.19	0.015	1.50	37.330	2%
	D92E	15611	14	54	140.4	0.9425	1.000	3.039	3.981		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			3.981	747.580	744.3	2.78%	200	VCT	117.92	1.51	0.015	1.30	47.408	8%
	15611	D976	8	62	161.2	1.08213	1.000	3.489	4.571		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.571	744.320	742.355	1.71%	200	VCT	115.06	1.18	0.015	1.62	37.147	12%
	D976	D8D8	16	78	202.8	1.36139	1.000	4.389	5.751		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			5.751	742.305	740.686	1.43%	200	VCT	113.15	1.08	0.015	1.74	34.002	17%
	FLOWS WEST ALONG 6 AVE																																									
	D8D8	D8E8	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	740.706	739.621	1.33%	200	VCT	81.33	1.05	0.015	1.30	32.832	2%
	D8E8	D8E2	6	15	39.0	0.26181	1.000	0.844	1.106		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.106	739.621	738.781	1.01%	200	VCT	83.32	0.91	0.015	1.53	28.541	4%
	D8E2	D8E3	6	21	54.6	0.36653	1.000	1.182	1.548		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.548	738.781	738.617	0.29%	200	VCT	57.36	0.48	0.015	1.98	15.199	10%
	D8E3	D8E4	13	34	88.4	0.59343	1.000	1.913	2.507		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.507	738.587	737.951	0.57%	200	VCT	112	0.68	0.015	2.74	21.420	12%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL			Existing Duty Point (Measured from Drawdown Tests)		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	Factory LS Flow 1 (50%)	17.14	l/s
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha	Factory LS Flow 2 (50%)		
Population:	5600										Jesmond LS	15.29	l/s
Residential I/I (l/s/ha)	0.6										Redcliff Way LS	15.64	l/s
Current Residential Area (ha)	202												

MANNINGS "n" VALUE		
PVC	0.013	
VCT	0.015	

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																							
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																																new data											
																																invert issue											
	D8E4	D99F	10	44	114.4	0.76796	1.000	2.476	**3.244**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.244**	737.951	737.505	0.40%	200	VCT	110.49	0.57	0.015	3.20	**18.060**	18%
	D99F	D8CE	11	55	143.0	0.95995	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.055**	737.485	736.86	0.56%	200	VCT	111.04	0.68	0.015	2.73	**21.326**	19%
4TH AVE TO WEST	D921	D99E	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	754.091	751.821	2.15%	200	VCT	105.58	1.33	0.015	1.33	**41.680**	0%
	D99E	D92C	0	17	44.2	0.29671	1.000	0.957	**1.253**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.253**	751.811	749.714	1.98%	200	VCT	105.7	1.27	0.015	1.38	**40.038**	3%
	D92C	D92E	0	31	80.6	0.54106	1.000	1.744	**2.285**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.285**	749.714	747.750	1.87%	200	VCT	105.12	1.24	0.015	1.42	**38.854**	6%
	D928	D927	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	753.550	752.663	1.02%	200	VCT	86.54	0.92	0.015	1.57	**28.778**	2%
	D927	D99E	9	17	44.2	0.29671	1.000	0.957	**1.253**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.253**	752.663	751.911	0.88%	200	VCT	85.89	0.85	0.015	1.69	**26.598**	5%
	D90D	D92D	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	751.736	751.206	0.46%	200	VCT	115.5	0.61	0.015	3.14	**19.255**	3%
	D92D	D92C	6	14	36.4	0.24435	1.000	0.788	**1.032**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.032**	751.206	749.714	1.30%	200	VCT	114.69	1.03	0.015	1.85	**32.421**	3%
	D922	D921	10	10	26.0	0.17454	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	755.507	754.221	1.08%	200	VCT	119.25	0.94	0.015	2.12	**29.519**	2%
	D952	D920	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	756.938	755.476	1.37%	200	VCT	106.41	1.06	0.015	1.67	**33.319**	1%
	D920	D921	0	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	755.466	754.101	1.29%	200	VCT	105.52	1.03	0.015	1.71	**32.330**	1%
6 AVE SE TO WEST	D8D5	D8D6	5	55	143.0	0.95995	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.055**	744.086	743.146	0.89%	200	VCT	105.52	0.85	0.015	2.06	**26.829**	15%
	D8D6	D8D7	6	98	254.8	1.71046	1.000	5.515	**7.225**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**7.225**	743.166	741.570	1.51%	200	VCT	105.78	1.11	0.015	1.59	**34.916**	21%
	D8D7	D8D8	0	132	343.2	2.30389	1.000	7.428	**9.732**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**9.732**	741.560	740.676	0.84%	200	VCT	104.93	0.83	0.015	2.11	**26.090**	37%
	D8D8	D8D9	0	210	546.0	3.66528	1.000	11.817	**15.482**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**15.482**	740.646	740.277	0.35%	200	VCT	105.35	0.54	0.015	3.28	**16.818**	92%
4 ST	D92C	D97C	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	749.714	747.410	2.65%	200	VCT	86.78	1.47	0.015	0.98	**46.317**	1%
	D97C	D96C	8	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	747.410	745.389	2.34%	200	VCT	86.25	1.38	0.015	1.04	**43.512**	3%
	D96C	D97D	9	25	65.0	0.43634	1.000	1.407	**1.843**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.843**	745.389	742.525	3.29%	200	VCT	87.12	1.64	0.015	0.89	**51.539**	4%
	D97D	D8D7	9	34	88.4	0.59343	1.000	1.913	**2.507**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.507**	745.525	741.580	4.60%	200	VCT	85.76	1.94	0.015	0.74	**60.966**	4%
5 ST	D99E	D97F	14	14	36.4	0.24435	1.000	0.788	**1.032**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.032**	751.911	749.408	2.20%	200	VCT	113.53	1.34	0.015	1.41	**42.207**	2%
	D97F	D97E	10	24	62.4	0.41889	1.000	1.351	**1.769**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.769**	749.408	745.903	3.03%	200	VCT	115.85	1.57	0.015	1.23	**49.443**	4%
	D97E	D8D6	13	37	96.2	0.64579	1.000	2.082	**2.728**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.728**	745.903	743.146	2.38%	200	VCT	115.83	1.40	0.015	1.38	**43.854**	6%
6 ST	D921	D980	12	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	754.431	750.596	3.15%	200	VCT	121.77	1.61	0.015	1.26	**50.445**	4%
	D980	D981	12	38	98.8	0.66324	1.000	2.138	**2.802**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.802**	750.596	746.972	2.97%	200	VCT	122	1.56	0.015	1.30	**48.991**	6%
	D981	D8D5	12	50	130.0	0.87269	1.000	2.814	**3.686**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.686**	746.972	743.786	3.12%	200	VCT	102.18	1.60	0.015	1.07	**50.193**	7%
7 AVE TO EAST	D8D7	FC60	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	741.570	740.300	1.24%	200	VCT	102.35	1.01	0.015	1.69	**31.664**	1%
	FC60	FC61	0	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	740.260	740.130	1.57%	200	PVC	8.29	1.31	0.013	0.11	**41.072**	1%
	FC61	17DCC	8	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	740.080	738.615	1.40%	200	PVC	105	1.23	0.013	1.42	**38.742**	2%
	17DCC	D8F6	7	20	52.0	0.34907	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	739.460	738.615	0.83%	200	PVC	101.98	0.95	0.013	1.79	**29.855**	5%
	FC60	FC5C	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	740.270	740.132	0.12%	200	VCT	111.56	0.32	0.015	5.84	**9.997**	4%
	FC5C	D8F6	5	11	28.6	0.19199	1.000	0.619	**0.811**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.811**	740.132	738.615	1.60%	250	VCT	94.74	1.33	0.015	1.19	**65.217**	1%
6 ST TO TRUNK	D8D5	D8F6	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	743.666	738.615	4.66%	200	VCT	108.44	1.95	0.015	0.93	**61.348**	1%
	D8F6	D8F7	11	48	124.8	0.83778	1.000	2.701	**3.539**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.539**	738.615	737.999	0.53%	200	VCT	115.92	0.66	0.015	2.93	**20.721**	17%
	D8F7	D8CB	14	62	161.2	1.08213	1.000	3.489	**4.571**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.571**	737.999	737.231	0.64%	200	PVC	119.68	0.84	0.013	2.39	**26.274**	17%
	D8CB	D8D2	9	71	184.6	1.23921	1.000	3.995	**5.234**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.234**	737.101	736.750	0.41%	200	VCT	85.4	0.58	0.015	2.45	**18.223**	29%
	D8D2	D8A3	9	80	208.0	1.3963	1.000	4.502	**5.898**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.898**	736.750	735.708	1.19%	200	VCT	87.28	0.99	0.015	1.47	**31.059**	19%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL			Existing Duty Point (Measured from Drawdown Tests)		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	17.14	l/s	Factory LS Flow 1 (50%)
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha			Factory LS Flow 2 (50%)
Population:	5600										15.29	l/s	Jesmond LS
Residential I/I (l/s/ha)	0.6										15.64	l/s	Redcliff Way LS
Current Residential Area (ha)	202												

MANNINGS "n" VALUE
PVC 0.013
VCT 0.015

new data
invert issue

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
5 ST TO TRUNK	D8CB	D8CA	Pipe shown on drawing but does not exist																																							
	D8CA	D8D1	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	737.436	737.098	0.43%	200	VCT	78.66	0.59	0.015	2.21	**18.633**	4%
	D8D1	D8A0	9	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	737.098	736.110	1.05%	200	VCT	93.73	0.93	0.015	1.68	**29.184**	5%
4 ST TO TRUNK	D8CA	D8C9	Pipe shown on drawing but does not exist																																							
	D8C9	D8D0	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	738.462	737.860	0.70%	200	VCT	86.21	0.76	0.015	1.90	**23.753**	3%
	D8D0	D8B8	9	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	737.850	736.400	1.68%	200	VCT	86.16	1.17	0.015	1.22	**36.875**	4%
7 ST TO TRUNK MAIN	D920	D96D	10	10	26.0	0.17454	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	755.486	751.275	3.47%	200	VCT	121.4	1.69	0.015	1.20	**52.941**	1%
	D96D	D982	12	22	57.2	0.38398	1.000	1.238	**1.622**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.622**	751.245	747.390	3.16%	200	VCT	122.08	1.61	0.015	1.27	**50.512**	3%
	D982	D8D4	10	32	83.2	0.55852	1.000	1.801	**2.359**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.359**	747.390	744.518	2.78%	200	VCT	103.25	1.51	0.015	1.14	**47.408**	5%
	D8D4	D8F5	10	42	109.2	0.73306	1.000	2.363	**3.096**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.096**	744.518	741.310	2.69%	200	VCT	119.36	1.48	0.015	1.34	**46.601**	7%
	D8F5	D8F4	10	52	135.2	0.90759	1.000	2.926	**3.834**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.834**	741.310	739.509	2.24%	200	VCT	80.3	1.36	0.015	0.99	**42.570**	9%
	D8F4	D8E9	17	69	179.4	1.20431	1.000	3.883	**5.087**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.087**	739.509	737.612	1.74%	200	VCT	108.88	1.19	0.015	1.52	**37.520**	14%
	D8E9	D8D3	14	83	215.8	1.44866	1.000	4.671	**6.119**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.119**	737.612	736.431	1.16%	200	VCT	101.89	0.97	0.015	1.74	**30.603**	20%
	D8D3	D89F	10	93	241.8	1.62319	1.000	5.233	**6.856**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.856**	736.401	735.490	0.85%	200	VCT	106.84	0.84	0.015	2.13	**26.248**	26%
	D8A1	D89F	18	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	736.31	735.49	0.72%	200	VCT	113.86	0.77	0.015	2.47	**24.123**	6%
MITCHELL ST	D991	D992	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	MH not found			200	VCT	42.54	0.00	0.015	#DIV/0!	**0.000**	
	D992	D8CC	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	738.193	737.210	1.36%	200	VCT	72.3	1.05	0.015	1.14	**33.145**	0%
	D8CC	D8CD	3	3	7.8	0.05236	1.000	0.169	**0.221**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.221**	737.190	736.310	1.02%	200	VCT	86.04	0.92	0.015	1.57	**28.747**	1%
	D8CD	D89E	3	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	736.300	734.680	1.87%	200	VCT	86.82	1.24	0.015	1.17	**38.829**	1%
1ST NOR	D8C2	D8C3	10	10	26.0	0.17454	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	738.392	738.100	0.38%	200	VCT	76.03	0.56	0.015	2.26	**17.616**	4%
	D8C3	D8BB	9	19	49.4	0.33162	1.000	1.069	**1.401**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.401**	738.100	737.160	1.23%	200	VCT	76.2	1.00	0.015	1.26	**31.571**	4%
2 ST NOR	D8C7	D8C6	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	739.349	738.762	0.77%	200	VCT	76.07	0.79	0.015	1.60	**24.970**	2%
	D8C6	D8B9	9	17	44.2	0.29671	1.000	0.957	**1.253**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.253**	738.762	736.835	2.54%	200	VCT	75.96	1.44	0.015	0.88	**45.274**	3%
3 ST NOR	D8B5	D8C8	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	738.980	737.253	2.20%	200	PVC	78.41	1.55	0.013	0.84	**48.676**	1%
	D8C8	D8CF	12	21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.548**	737.253	736.787	0.50%	200	VCT	94.04	0.64	0.015	2.46	**20.010**	8%
RIVERVIEW	1B814	D8AA	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	742.122	741.199	1.10%	200	PVC	84.09	1.09	0.013	1.28	**34.362**	2%
	D8AA	D8AB	5	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	741.199	740.482	1.64%	200	PVC	43.63	1.34	0.013	0.54	**42.046**	2%
	1B814	D8A9	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	742.122	741.636	1.10%	200	PVC	44.01	1.10	0.013	0.67	**34.466**	1%
	D8A9	D8AB	5	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	741.636	740.482	1.39%	200	PVC	83.32	1.23	0.013	1.13	**38.599**	2%
	D8AB	D8A8	5	27	70.2	0.47125	1.000	1.519	**1.991**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.991**	740.482	738.760	2.32%	200	PVC	74.34	1.59	0.013	0.78	**49.918**	4%
	D8AF	D8AE	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	739.846	739.161	1.07%	200	PVC	63.76	1.08	0.013	0.98	**33.996**	1%
	D8AC	D8F7	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	739.849	739.714	0.54%	200	PVC	25.08	0.77	0.013	0.55	**24.063**	3%
	D8F7	D8AE	7	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	739.714	739.161	0.56%	200	PVC	99.61	0.78	0.013	2.13	**24.438**	5%
	D8AE	D8A8	5	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	739.161	738.760	0.47%	200	PVC	84.86	0.72	0.013	1.97	**22.546**	9%
	D8A8	DEA7	5	58	150.8	1.01231	1.000	3.264	**4.276**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.276**	738.760	738.560	0.45%	200	PVC	44.93	0.70	0.013	1.08	**21.883**	20%
	DEA7	EC33	19	77	200.2	1.34394	1.000	4.333	**5.677**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.677**	738.560	737.810	0.44%	200	PVC	170.2	0.69	0.013	4.09	**21.772**	26%
	EC33	D8A2	10	87	226.2	1.51847	1.000	4.896	**6.414**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.414**	737.810	736.780	1.31%	200	VCT	78.82	1.03	0.015	1.27	**32.494**	20%
	D8A2	D8A3	10	97	252.2	1.69301	1.000	5.458	**7.151**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**7.151**	736.780	736.130	0.70%	200	VCT	93.33	0.76	0.015	2.06	**23.722**	30%
	D8AF	D8B0	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	739.846	739.493	0.55%	200	PVC	64.76	0.77	0.013	1.40	**24.215**	2%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	15.29	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL CONTRIBUTING LOTS	RESIDENTIAL TOTAL CONTRIBUTING LOTS	RESIDENTIAL ASSUMED NUMBER OF PERSONS	RESIDENTIAL Q Average	RESIDENTIAL PEAK FACTOR	RESIDENTIAL I/I ALLOWANCE (l/s)	**RESIDENTIAL FLOW (l/s)**	COMMERCIAL CONTRIBUTING AREAS (ha)	COMMERCIAL TOTAL CONTRIBUTING AREAS (ha)	COMMERCIAL Q Average	COMMERCIAL PEAK FACTOR	COMMERCIAL I/I ALLOWANCE (l/s)	**COMMERCIAL FLOW (l/s)**	HORTICULTURAL CONTRIBUTING AREAS (ha)	HORTICULTURAL TOTAL CONTRIBUTING AREAS (ha)	HORTICULTURAL Q Average	HORTICULTURAL PEAK FACTOR	HORTICULTURAL I/I ALLOWANCE (l/s)	**HORTICULTURAL FLOW (l/s)**	INDUSTRIAL CONTRIBUTING AREAS (ha)	INDUSTRIAL TOTAL CONTRIBUTING AREAS (ha)	INDUSTRIAL Q Average	INDUSTRIAL PEAK FACTOR	INDUSTRIAL I/I ALLOWANCE (l/s)	**INDUSTRIAL FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																														new data											
																														invert issue											
EASTSIDE PHASE 1	D8B0	D8B1	5	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	739.493	739.125	0.59%	200	PVC	62.51	0.80	0.013	1.30	**25.165**	4%
	D8B2	D8B1	13	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	740.677	739.125	1.81%	200	PVC	85.92	1.40	0.013	1.02	**44.081**	2%
	D8B1	D8B3	2	28	72.8	0.4887	1.000	1.576	**2.064**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.064**	739.125	738.430	0.77%	200	PVC	90.71	0.91	0.013	1.65	**28.709**	7%
	D8B6	D8B5	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	739.640	738.980	0.50%	200	PVC	133.19	0.73	0.013	3.02	**23.088**	3%
	D8B5	D8B3	5	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	738.980	738.430	0.52%	200	PVC	105.27	0.75	0.013	2.33	**23.707**	4%
	D8B3	D8B7	10	51	132.6	0.89014	1.000	2.870	**3.760**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.760**	738.430	737.680	0.87%	200	VCT	86.49	0.84	0.015	1.71	**26.470**	14%
	D8B7	D8B8	8	59	153.4	1.02977	1.000	3.320	**4.350**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.350**	737.680	736.400	1.48%	200	VCT	86.31	1.10	0.015	1.31	**34.616**	13%
	6BC77	6BC71	16	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	735.760	735.341	0.62%	200	PVC	68.02	0.82	0.013	1.38	**25.742**	5%
	6BC71	BBC72	16	55	143.0	0.95995	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.055**	735.311	734.650	0.90%	200	PVC	73.26	0.99	0.013	1.23	**31.154**	13%
	BBC72	6BC74	12	93	241.8	1.62319	1.000	5.233	**6.856**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.856**	734.620	734.033	0.60%	200	PVC	97.2	0.81	0.013	2.00	**25.488**	27%
	6BC6F	6BC70	18	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	736.887	736.540	0.40%	200	PVC	86.78	0.66	0.013	2.19	**20.740**	6%
	6BC70	6BC71	5	23	59.8	0.40144	1.000	1.294	**1.696**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.696**	736.540	736.046	0.52%	200	PVC	94.5	0.75	0.013	2.09	**23.714**	7%
	6BC75	6BC73	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	735.498	735.277	0.60%	200	PVC	36.75	0.81	0.013	0.76	**25.434**	1%
	6BC73	6BC72	6	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	735.247	734.680	0.60%	200	PVC	94.5	0.81	0.013	1.95	**25.406**	8%
	6BC76	6BC73	15	15	39.0	0.26181	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.106**	736.086	735.307	0.80%	200	PVC	97	0.94	0.013	1.73	**29.392**	4%
5 ST TO NORTH	D8B4	D8A5	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	738.380	738.040	0.41%	200	PVC	83.7	0.67	0.013	2.10	**20.904**	2%
	D8A6	D8A5	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	738.280	738.040	0.50%	200	PVC	48.43	0.73	0.013	1.10	**23.089**	1%
	D8A5	D8A4	10	20	52.0	0.34907	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	738.040	737.430	0.77%	200	VCT	79.1	0.79	0.015	1.66	**24.962**	6%
	D8A4	D8A0	10	30	78.0	0.52361	1.000	1.688	**2.212**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.212**	737.430	736.110	1.42%	200	VCT	93.22	1.08	0.015	1.44	**33.825**	7%
TRUNK MAIN	DA0E	DA0D	4	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	733.568	733.208	0.29%	450	PVC	122.09	0.97	0.013	2.09	**154.817**	104%
	DA0D	DA0C	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	733.168	732.867	0.30%	450	PVC	100.2	0.98	0.013	1.70	**156.263**	104%
	DA0C	DA0B	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	732.657	731.147	1.26%	450	PVC	119.98	2.01	0.013	0.99	**319.846**	51%
	DA0B	DA0A	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	731.137	729.826	1.09%	375	PVC	120.64	1.65	0.013	1.22	**182.773**	89%
	Future	DA0A																										**0.000**													
	DA0A	DA09	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	729.716	727.367	1.92%	375	VCT	122.31	1.91	0.015	1.07	**210.581**	77%
	DA09	DA08	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	727.347	726.177	0.95%	375	VCT	122.66	1.34	0.015	1.52	**148.406**	109%
	DA08	DA07	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	726.167	725.577	0.48%	375	VCT	122.21	0.96	0.015	2.13	**105.580**	153%
	DA07	DA06	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	725.557	724.960	0.49%	375	VCT	121.55	0.96	0.015	2.10	**106.492**	152%
	DA06	DA05	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	724.860	723.487	1.12%	375	VCT	122.43	1.46	0.015	1.40	**160.916**	101%
	DA05	DA04	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	723.502	722.956	0.45%	375	VCT	121.26	0.92	0.015	2.19	**101.964**	159%
	Future	DA04																										**0.000**													
	DA04	DA03	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	722.946	722.387	0.46%	375	VCT	121.3	0.93	0.015	2.16	**103.154**	157%
	DA03	E86F	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	48.070	**161.779**	722.377	722.038	0.78%	375	VCT	43.5	1.21	0.015	0.60	**134.142**	121%
		SUM	1837	4776.2						7.26						4.54						0.00																			
		CHECK	OK							OK						OK						OK																			
																																								86-100%	12
																																								100-150%	17
																																								150-250%	4
																																								>250%	0

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NW TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen	0.4	l/s/ha	Gen	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point 43.88 (measured by Draw down tests)

NW LS	43.88	l/s

MANNINGS "n" VALUE

PVC	0.013
VCT	0.015

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																						
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE FLOW (l/s)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																																new data											
																																invert issue											
8 ST	D9AE	D9B1		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	741.664	740.591	0.93%	200	PVC	114.78	1.01	0.013	1.90	**31.712**	0%
	D9B1	44DF9		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.86	1.86	0.744	1.000	0.372	**1.116**		0	0	1.000	0.000	**0.000**			**1.116**	740.591	740.335	0.40%	200	PVC	63.56	0.66	0.013	1.60	**20.815**	5%
	44DF9	D9B2		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		1.86	0.744	1.000	0.372	**1.116**		0	0	1.000	0.000	**0.000**			**1.116**	740.345	740.029	0.51%	200	PVC	62.56	0.74	0.013	1.41	**23.310**	5%
	Future	D9B2																											**0.000**														
	D9B2	D9B4	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**	0.87	2.73	1.092	1.000	0.546	**1.638**		0	0	1.000	0.000	**0.000**	**0.000**		**2.375**	740.019	739.672	0.42%	200	PVC	82.83	0.68	0.013	2.04	**21.229**	11%
	D9B4	D9B5		10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		4.59	1.836	1.000	0.918	**2.754**		0	0	1.000	0.000	**0.000**	**0.000**		**3.491**	739.692	739.243	0.40%	200	PVC	113.15	0.66	0.013	2.87	**20.661**	17%
	D9B3	D9B4		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.86	1.86	0.744	1.000	0.372	**1.116**		0	0	1.000	0.000	**0.000**			**1.116**	740.005	739.702	0.47%	200	PVC	63.99	0.72	0.013	1.48	**22.569**	5%
6 ST	D9AD	D9AF		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	2.25	2.25	0.9	1.000	0.450	**1.350**		0	0	1.000	0.000	**0.000**			**1.350**	741.223	740.951	0.46%	200	PVC	59.13	0.71	0.013	1.39	**22.245**	6%
	D9AF	D9B0		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		2.25	0.9	1.000	0.450	**1.350**		0	0	1.000	0.000	**0.000**			**1.350**	740.941	740.695	0.47%	200	PVC	52.01	0.72	0.013	1.21	**22.557**	6%
	D9B0	29072		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.49	3.74	1.496	1.000	0.748	**2.244**		0	0	1.000	0.000	**0.000**			**2.244**	740.675	740.070	0.63%	200	PVC	96.13	0.83	0.013	1.93	**26.020**	9%
	29072	D9B5		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		3.74	1.496	1.000	0.748	**2.244**		0	0	1.000	0.000	**0.000**			**2.244**	740.060	739.223	0.59%	200	PVC	141.95	0.80	0.013	2.95	**25.185**	9%
	D9B5	D9B6	5	15	39	0.2618	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		8.33	3.332	1.000	1.666	**4.998**		0	0	1.000	0.000	**0.000**	**0.000**		**6.104**	739.223	739.170	0.06%	200	PVC	89.93	0.25	0.013	5.91	**7.962**	77%
	D9B6	D9B9	5	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**	1.29	9.62	3.848	1.000	1.924	**5.772**		0	0	1.000	0.000	**0.000**	**0.000**		**7.247**	739.070	738.500	0.67%	200	PVC	84.94	0.86	0.013	1.66	**26.868**	27%
	D9B9	EC5E		26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**	1.29	14.59	5.836	1.000	2.918	**8.754**		0	0	1.000	0.000	**0.000**	**0.000**		**10.671**	738.480	738.110	0.43%	200	VCT	86.68	0.59	0.015	2.44	**18.571**	57%
	EC5E	D9C8		26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		14.59	5.836	1.000	2.918	**8.754**		0	0	1.000	0.000	**0.000**	**0.000**		**10.671**	738.110	737.704	0.47%	200	VCT	85.85	0.62	0.015	2.30	**19.548**	55%
1 AVE	D9B7	D9B8	2	2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**	1.84	1.84	0.736	1.000	0.368	**1.104**		0	0	1.000	0.000	**0.000**			**1.251**	739.346	738.972	0.45%	200	PVC	83.92	0.70	0.013	2.01	**21.896**	6%
	D9B8	D9B9	4	6	15.6	0.1047	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**	1.84	3.68	1.472	1.000	0.736	**2.208**		0	0	1.000	0.000	**0.000**			**2.650**	738.902	738.500	0.35%	200	PVC	113.66	0.62	0.013	3.05	**19.506**	14%
2 AVE	D9C7	D9C6		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	738.448	738.153	0.93%	200	VCT	31.85	0.87	0.015	0.61	**27.357**	0%
	D9C5	D9C6	3	3	7.8	0.0524	1.000	0.169	**0.221**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.221**	738.449	738.153	1.04%	200	PVC	28.46	1.06	0.013	0.45	**33.449**	1%
	D9C6	D9C8		3	7.8	0.0524	1.000	0.169	**0.221**		0	0	1.000	0.000	**0.000**	1.79	1.79	0.716	1.000	0.358	**1.074**		0	0	1.000	0.000	**0.000**			**1.295**	738.133	737.684	0.39%	200	PVC	114.89	0.65	0.013	2.93	**20.504**	6%
	D9C8	D9CB	1	30	78	0.5236	1.000	1.688	**2.212**		0	0	1.000	0.000	**0.000**		16.38	6.552	1.000	3.276	**9.828**		0	0	1.000	0.000	**0.000**	**0.000**		**12.040**	737.654	737.370	0.29%	200	PVC	97.12	0.56	0.013	2.87	**17.736**	68%
5 ST	D9BB	D9BE		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.85	1.85	0.74	1.000	0.370	**1.110**		0	0	1.000	0.000	**0.000**			**1.110**	739.915	739.787	0.31%	200	PVC	41.49	0.58	0.013	1.19	**18.217**	6%
	D9BE	D9BF	2	2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**		1.85	0.74	1.000	0.370	**1.110**		0	0	1.000	0.000	**0.000**			**1.257**	739.767	739.462	0%	200	PVC	84.13	0.63	0.013	2.23	**19.748**	6%
	D9BF	D9C0		2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**	0.45	2.3	0.92	1.000	0.460	**1.380**		0	0	1.000	0.000	**0.000**			**1.527**	739.452	739.146	0.37%	200	VCT	83.48	0.55	0.015	2.54	**17.210**	9%
	D9C0	D9C4		2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**		2.3	0.92	1.000	0.460	**1.380**		0	0	1.000	0.000	**0.000**			**1.527**	739.146	738.731	0.47%	200	VCT	87.56	0.62	0.015	2.34	**19.569**	8%
	D9C4	D9CB		2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**		2.3	0.92	1.000	0.460	**1.380**		0	0	1.000	0.000	**0.000**			**1.527**	738.731	737.340	1.60%	200	PVC	86.95	1.32	0.013	1.10	**41.484**	4%
	D9CB	EC5A	5	37	96.2	0.6458	1.000	2.082	**2.728**		0	0	1.000	0.000	**0.000**		18.68	7.472	1.000	3.736	**11.208**		0	0	1.000	0.000	**0.000**	**0.000**		**13.936**	737.340	737.103	0.27%	200	PVC	86.74	0.55	0.013	2.65	**17.144**	81%
	EC5A	D9CC	4	41	106.6	0.7156	1.000	2.307	**3.023**		0	0	1.000	0.000	**0.000**		18.68	7.472	1.000	3.736	**11.208**		0	0	1.000	0.000	**0.000**	**0.000**		**14.231**	737.103	736.864	0.28%	200	PVC	85.32	0.55	0.013	2.57	**17.359**	82%
3 AVE	Future	D9C9																											**0.000**														
	D9C9	D9CA		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	3.02	3.02	1.208	1.000	0.604	**1.812**		0	0	1.000	0.000	**0.000**	**0.000**		**1.812**	736.755	736.252	0.49%	200	PVC	103.11	0.73	0.013	2.36	**22.908**	8%
	D9CA	D9CC		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		3.02	1.208	1.000	0.604	**1.812**		0	0	1.000	0.000	**0.000**	**0.000**		**1.812**	736.252	735.484	0.83%	200	PVC	92.59	0.95	0.013	1.62	**29.871**	6%
	D9CC	D93E		41	106.6	0.7156	1.000	2.307	**3.023**		0	0	1.000	0.000	**0.000**	1.4	23.1	9.24	1.000	4.620	**13.860**		0	0	1.000	0.000	**0.000**	**0.000**		**16.883**	735.494	735.149	0.33%	200	PVC	103.91	0.60	0.013	2.88	**18.899**	89%
BROADWAY	D9C2	D9C1	12	12	31.2	0.2094	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	745.601	745.476	0.42%	250	PVC	29.54	0.79	0.013	0.62	**38.684**	2%
	D9C1	137E6		12	31.2	0.2094	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	745.466	744.135	1.07%	250	PVC	124.13	1.25	0.013	1.65	**61.579**	1%
	137E6	D938		12	31.2	0.2094	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	744.115	742.629	1.32%	250	PVC	112.36	1.39	0.013	1.34	**68.389**	1%
4 ST	D9BA	2908D	1	1	2.6	0.0175	1.000	0.056	**0.074**		0	0	1.000	0.000	**0.000**	0.97	0.97	0.388	1.000	0.194	**0.582**		0	0	1.000	0.000	**0.000**			**0.656**	741.423	741.415	0.03%	250	PVC	29.87	0.20	0.013	2.51	**9.732**	7%
	2908D	D9BC	3	4	10.4	0.0698	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0.97	0.388	1.000	0.194	**0.582**		0	0	1.000	0.000	**0.000**			**0.877**	741.415	741.209	0.33%	250	PVC	63.12	0.69	0.013	1.52	**33.973**	3%
	D9BC	D938	2	6	15.6	0.1047	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0.97	0.388	1.000	0.194	**0.582**		0	0	1.000	0.000	**0.000**			**1.024**	741.189	740.989	0.31%	250	PVC	65.46	0.67	0.013	1.63	**32.871**	3%
	D938	D939	4	22	57.2	0.384	1.000	1.238	**1.622**		0	0	1.000	0.000	**0.000**	0.52	1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**2.516**	740.999	740.674	0.37%	250	PVC	88.78	0.73	0.013	2.02	**35.980**	7%
	D939	DD0C	3	25	65	0.4363	1.000	1.407	**1.843**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**2.737**	740.694	740.477	0.26%	250	PVC	83.76	0.62	0.013	2.26	**30.269**	9%
	DD0C	D93B	10	35	91	0.6109	1.000	1.970	**2.580**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**3.474**	740.437	740.150	0.33%	250	PVC	86.48	0.70	0.013	2.07	**34.258**	10%
	D93B	D93C	10	45	117	0.7854	1.000	2.532	**3.318**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**4.212**	740.180	739.837	0.40%	250	PVC	86.75	0.76	0.013	1.90	**37.393**	11%
	D93C	D93D	10	55	143	0.96	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**4.949**	739.847	739.397	0.52%	250	PVC	86.17	0.88	0.013	1.64	**42.974**	12%
	D93D	D93E	10	65	169	1.1345	1.000	3.658	**4.792**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**5.686**	738.407	737.099	1.56%	250	PVC	84.05	1.51	0.013	0.93	**74.185**	8%
3 ST	1420D	D942	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	742.016	741.700	0.51%	200	PVC	61.87	0.75	0.013	1.38	**23.440**	3%
	D942	D941	10	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	16.11	16.11	1.6916	1.000	0.322	**2.014**			**3.488**	741.700	741.315	0.41%	200	PVC	92.98	0.67	0.013	2.31	**21.105**	17%
	D941	D940	0	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**3.488**	741.315	740.240	19.13%	200	PVC	5.62	4.57	0.013	0.02	**143.446**	2%
	D940	FB42	10	30	78	0.5236	1.000	1.688	**2.212**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**4.226**	740.230	739.420	0.93%	200	PVC	87.34	1.01	0.013	1.45	**31.586**	13%
	FB42	D9CE	10	40	104	0.6981	1.000	2.251	**2.949**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**4.963**	739.400	736.759	3.13%	200	PVC	84.46	1.85	0.013	0.76	**57.998**	9%
	D9CE	D93E	0	55	143	0.96	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**6.069**	737.459	735.159	2.16%	250	PVC	106.57	1.78	0.013	1.00	**87.363**	7%
	13923	D9CE	15	15	39	0.2618	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.106**	737.231	736.809	0.80%	200	PVC	53.05	0.93	0.013	0.95	**29.253**	4%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NW TRUNK SYSTEM

	RESIDENTIAL			COMMERCIAL				HORTICULTURAL				INDUSTRIAL			
Residential Average per capita daily flow:	580			Gen	0.36	l/s/ha		Gen	0.4	l/s/ha		Gen	0.105	l/s/ha	
Assumed Persons Per household:	2.6			I/I	0.06	l/s/ha		I/I	0.2	l/s/ha		I/I	0.02	l/s/ha	
Population:	5600														
Residential I/I (l/s/ha)	0.6														
Current Residential Area (ha)	202														

Existing Duty Point 43.88 (measured by Draw down tests)

NW LS 43.88 l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																			
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																															new data										
																															invert issue										
SOUTH RAILWAY DR AREA	EA33	EA32		0.00	0	0	1.000	0.000	**0.000**	0.39	0.39	0.1404	1.000	0.023	**0.164**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.164**	744.630	744.360	0.43%	200	PVC	62.73	0.68	0.013	1.53	**21.518**	1%
	EA32	D9E2		0.00	0	0	1.000	0.000	**0.000**	0.47	0.86	0.3096	1.000	0.052	**0.361**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.361**	744.360	743.303	2.76%	200	PVC	38.35	1.73	0.013	0.37	**54.451**	1%
	D9E2	D9E3		0.00	0	0	1.000	0.000	**0.000**	0.48	1.34	0.4824	1.000	0.080	**0.563**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.563**	743.343	742.908	0.40%	200	VCT	107.96	0.57	0.015	3.13	**18.043**	3%
	D9E3	D88A		0.00	0	0	1.000	0.000	**0.000**	0.84	2.18	0.7848	1.000	0.131	**0.916**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.916**	742.898	742.347	0.58%	200	VCT	94.78	0.69	0.015	2.29	**21.673**	4%
	D950	D9E1	6	6.00	15.6	0.1047	1.000	0.338	**0.442**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.442**	745.851	743.420	3.49%	200	PVC	69.59	1.95	0.013	0.59	**61.302**	1%
	D9E1	D88A	5	11.00	28.6	0.192	1.000	0.619	**0.811**	0.45	0.45	0.162	1.000	0.027	**0.189**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.000**	743.400	742.527	1.08%	200	PVC	80.75	1.09	0.013	1.24	**34.103**	3%
	D88A	D88B		11.00	28.6	0.192	1.000	0.619	**0.811**	0.65	3.28	1.1808	1.000	0.197	**1.378**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**2.189**	742.357	741.883	0.40%	200	VCT	118.31	0.57	0.015	3.44	**17.992**	12%
	D88B	D896		21.00	54.6	0.3665	1.000	1.182	**1.548**	0.71	4.83	1.7388	1.000	0.290	**2.029**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**3.577**	741.453	740.727	0.61%	200	VCT	118.14	0.71	0.015	2.78	**22.283**	16%
	D896	D895		41.00	106.6	0.7156	1.000	2.307	**3.023**	0.65	6.23	2.2428	1.000	0.374	**2.617**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**5.639**	740.727	740.351	0.35%	200	VCT	106.99	0.54	0.015	3.32	**16.851**	33%
	D9E0	D948																																							
	D9E0	D88B	10	10.00	26	0.1745	1.000	0.563	**0.737**	0.84	0.84	0.3024	1.000	0.050	**0.353**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.090**	745.344	741.723	2.63%	200	PVC	137.79	1.69	0.013	1.36	**53.169**	2%
	D946	D947	20	20.00	52	0.3491	1.000	1.125	**1.475**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.475**	745.970	743.390	1.98%	200	PVC	130.56	1.47	0.013	1.48	**46.106**	3%
	D947	D896		20.00	52	0.3491	1.000	1.125	**1.475**	0.75	0.75	0.27	1.000	0.045	**0.315**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.790**	743.360	740.727	2.19%	200	PVC	120.04	1.55	0.013	1.29	**48.575**	4%
	3A3F6	D895		0.00	0	0	1.000	0.000	**0.000**	0.73	0.73	0.2628	1.000	0.044	**0.307**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.307**	744.923	740.881	3.05%	200	PVC	132.5	1.82	0.013	1.21	**57.285**	1%
	D895	D894		41.00	106.6	0.7156	1.000	2.307	**3.023**		6.96	2.5056	1.000	0.418	**2.923**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**5.946**	740.321	740.055	0.54%	200	VCT	48.91	0.67	0.015	1.22	**20.963**	28%
	D890	D894		0.00	0	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	1.4	1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**0.840**	742.827	740.065	3.33%	200	VCT	83.04	1.65	0.015	0.84	**51.841**	2%
1 ST NE	D894	D9E4		41.00	106.6	0.7156	1.000	2.307	**3.023**	0.37	7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**6.941**	740.005	739.798	0.32%	200	VCT	64.15	0.51	0.015	2.08	**16.147**	43%
	D9E4	EC51		41.00	106.6	0.7156	1.000	2.307	**3.023**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**6.941**	739.788	739.270	1.22%	200	VCT	42.42	1.00	0.015	0.71	**31.411**	22%
	EC51	D9E5	5	46.00	119.6	0.8029	1.000	2.588	**3.391**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**7.310**	739.270	738.651	0.61%	200	VCT	101.72	0.71	0.015	2.40	**22.174**	33%
	D9E5	D9E6	5	51.00	132.6	0.8901	1.000	2.870	**3.760**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**7.679**	738.651	738.415	0.28%	200	VCT	84.62	0.48	0.015	2.95	**15.012**	51%
	D9E6	D9DC	5	56.00	145.6	0.9774	1.000	3.151	**4.129**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**8.047**	738.415	737.768	0.59%	200	VCT	110.44	0.69	0.015	2.66	**21.757**	37%
	D9E7	E9E6		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	738.696	738.415	0.80%	200	PVC	35.1	0.93	0.013	0.63	**29.346**	0%
MAIN ST	D9D2	D9D9	8	8	20.8	0.1396	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	738.446	738.128	0.41%	200	PVC	77.11	0.67	0.013	1.92	**21.063**	3%
	D9D9	D9DC	8	16	41.6	0.2793	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	738.118	737.798	0.42%	200	PVC	76.17	0.68	0.013	1.88	**21.259**	6%
	D9DF	D9DD	8	8	20.8	0.1396	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	738.231	738.007	0.44%	200	PVC	51.01	0.69	0.013	1.23	**21.734**	3%
	D9DD	D9DC	8	16	41.6	0.2793	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	737.987	737.748	0.47%	200	PVC	50.92	0.72	0.013	1.19	**22.470**	5%
	D9DC	D9DA	0	88.00	228.8	1.5359	1.000	4.952	**6.488**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**10.406**	737.668	737.172	0.45%	200	PVC	110.17	0.70	0.013	2.62	**22.007**	47%
1 ST NW	D9D1	D9D8	10.00	10.00	26	0.1745	1.000	0.563	**0.737**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.737**	739.064	737.940	1.30%	200	PVC	86.7	1.19	0.013	1.22	**37.345**	2%
	D9D8	D9DA	10	20.00	52	0.3491	1.000	1.125	**1.475**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.475**	737.930	737.352	0.95%	200	PVC	60.89	1.02	0.013	1.00	**31.955**	5%
	D9DE	D9DB	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	737.866	737.669	0.40%	200	PVC	49.5	0.66	0.013	1.25	**20.691**	4%
	D9DB	D9DA	10	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	737.649	737.272	0.69%	200	PVC	54.31	0.87	0.013	1.04	**27.326**	5%
	D9DA	D9D7	0	128.00	332.8	2.2341	1.000	7.203	**9.437**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**13.355**	737.152	736.743	0.39%	200	PVC	105.33	0.65	0.013	2.70	**20.438**	65%
2 ST NW	3CA9F	D9D0	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	739.050	738.813	0.46%	200	PVC	51.7	0.71	0.013	1.22	**22.207**	3%
	D9D0	D9D7	10	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	738.793	737.033	1.47%	200	PVC	119.8	1.27	0.013	1.58	**39.754**	4%
	D9D7	D9D6		148.00	384.8	2.5831	1.000	8.328	**10.911**	1.53	8.86	3.1896	1.000	0.532	**3.721**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**15.473**	736.743	736.269	0.45%	200	PVC	105.17	0.70	0.013	2.50	**22.019**	70%
	13924	D9D6	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	737.308	736.269	1.03%	200	PVC	100.98	1.06	0.013	1.59	**33.269**	2%
	D9D6	D9D5		158.00	410.8	2.7577	1.000	8.891	**11.649**		8.86	3.1896	1.000	0.532	**3.721**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**16.210**	736.269	735.750	0.48%	200	PVC	108.14	0.72	0.013	2.49	**22.722**	71%
4 AVE NW	D9D3	D9D4		0	0	0	1.000	0.000	**0.000**	3.14	3.14	1.1304	1.000	0.188	**1.319**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.319**	736.267	735.946	0.32%	200	PVC	99.04	0.59	0.013	2.78	**18.672**	7%
	Future	D9D4																										**0.000**													
	D9D4	D9D5		0	0	0	1.000	0.000	**0.000**		3.14	1.1304	1.000	0.188	**1.319**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**		**1.319**	735.926	735.890	0.41%	200	PVC	8.71	0.67	0.013	0.22	**21.086**	6%
TO LS	D9D5	D9CF		158.00	410.8	2.7577	1.000	8.891	**11.649**		12.00	4.32	1.000	0.720	**5.040**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**	**0.000**		**17.529**	735.730	735.363	0.43%	200	PVC	84.85	0.69	0.013	2.06	**21.571**	81%
	D9CF	D93E		158.00	410.8	2.7577	1.000	8.891	**11.649**	0.54	12.54	4.5144	1.000	0.752	**5.267**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**	**0.000**		**17.755**	735.263	734.459	0.94%	200	PVC	85.71	1.01	0.013	1.41	**31.766**	56%
	D93E	D93F		319.00	829.4	5.5677	1.000	17.951	**23.518**		12.54	4.5144	1.000	0.752	**5.267**		25.99	10.396	1.000	5.198	**15.594**		16.11	1.6916	1.000	0.322	**2.014**	**0.000**		**46.393**	734.419	733.520	0.65%	500	PVC	138.18	1.55	0.013	1.48	**304.568**	15%
	D93F	DDIE		319.00	829.4	5.5677	1.000	17.951	**23.518**		12.54	4.5144	1.000	0.752	**5.267**		25.99	10.396	1.000	5.198	**15.594**		16.11	1.6916	1.000	0.322	**2.014**	**0.000**		**46.393**	733.520	733.480	0.25%	525	PVC	15.72	1.00	0.013	0.26	**216.938**	21%
	LS	E888		319.00	829.4	5.5677	1.000	17.951	**23.518**		12.54	4.5144	1.000	0.752	**5.267**		25.99	10.396	1.000	5.198	**15.594**		16.11	1.6916	1.000	0.322	**2.014**		**43.880**					250	PVC	1214.48		0.013		LS OVER CAPACITY	

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NW TRUNK SYSTEM

		RESIDENTIAL	COMMERCIAL	HORTICULTURAL	INDUSTRIAL
Residential Average per capita daily flow:	580	Gen 0.36 l/s/ha	Gen 0.4 l/s/ha	Gen 0.105 l/s/ha
Assumed Persons Per household:	2.6	I/I 0.06 l/s/ha	I/I 0.2 l/s/ha	I/I 0.02 l/s/ha
Population:	5600			
Residential I/I (l/s/ha)	0.6			
Current Residential Area (ha)	202			

NW LS 43.88 l/s — Existing Duty Point 43.88 (measured by Draw down tests)

MANNINGS "n" VALUE: PVC 0.013; VCT 0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL CONTRIBUTING LOTS	RESIDENTIAL TOTAL CONTRIBUTING LOTS	RESIDENTIAL ASSUMED NUMBER OF PERSONS	RESIDENTIAL Q Average	RESIDENTIAL PEAK FACTOR	RESIDENTIAL I/I ALLOWANCE (l/s)	**RESIDENTIAL FLOW (l/s)**	COMMERCIAL CONTRIBUTING AREAS	COMMERCIAL TOTAL CONTRIBUTING AREAS	COMMERCIAL Q Average	COMMERCIAL PEAK FACTOR	COMMERCIAL I/I ALLOWANCE (l/s)	**COMMERCIAL FLOW (l/s)**	HORTICULTURAL CONTRIBUTING AREAS	HORTICULTURAL TOTAL CONTRIBUTING AREAS	HORTICULTURAL Q Average	HORTICULTURAL PEAK FACTOR	HORTICULTURAL I/I ALLOWANCE (l/s)	**HORTICULTURAL FLOW (l/s)**	INDUSTRIAL CONTRIBUTING AREAS	INDUSTRIAL TOTAL CONTRIBUTING AREAS	INDUSTRIAL Q Average	INDUSTRIAL PEAK FACTOR	INDUSTRIAL I/I ALLOWANCE (l/s)	**INDUSTRIAL FLOW (l/s)**	**FUTURE FLOW (l/s)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																																new data										
																																invert issue										
TRUNK MAIN TO END	E888	E889		0.00	0	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**43.880**	742.258	741.777	0.37%	375	PVC	128.38	0.97	0.013	2.20	**107.320**	41%
	E889	E88A		0.00	0	0	1.000	0.000	**0.000**	0.93	0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	741.777	741.200	0.41%	375	PVC	140.95	1.02	0.013	2.31	**112.179**	39%
	E88A	E88B		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	741.200	740.778	0.39%	375	PVC	108.9	0.99	0.013	1.84	**109.144**	41%
	E88B	E88C		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	740.778	740.256	0.48%	375	PVC	109.22	1.10	0.013	1.66	**121.211**	37%
	E88C	E887		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	740.171	739.815	1.00%	375	PVC	35.74	1.58	0.013	0.38	**174.986**	25%
	E887	E886		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	740.399	739.964	0.55%	450	PVC	79.39	1.33	0.013	1.00	**211.042**	21%
	E886	D94E		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	739.964	739.409	0.52%	450	PVC	106.46	1.29	0.013	1.37	**205.854**	22%
	D94E	E884		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	739.409	739.159	0.23%	450	PVC	107.19	0.87	0.013	2.06	**137.689**	32%
	E884	E883		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**43.880**	**44.271**	739.159	738.032	1.28%	450	PVC	87.93	2.03	0.013	0.72	**322.775**	14%
	Future	E883																										**0.000**	**43.880**													
	E883	E882		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	738.032	736.757	0.95%	450	PVC	134.9	1.74	0.013	1.29	**277.176**	16%
	E882	E881		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	736.757	735.053	1.45%	450	PVC	117.24	2.16	0.013	0.90	**343.719**	13%
	E881	E880		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	735.053	734.241	1.11%	450	PVC	73.28	1.89	0.013	0.65	**300.118**	15%
	E880	E87F		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	734.241	733.231	1.22%	450	PVC	82.79	1.98	0.013	0.70	**314.904**	14%
	E87F	E87E		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	733.231	732.107	1.35%	450	PVC	83.13	2.08	0.013	0.66	**331.521**	13%
	E87E	E87D		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	732.107	730.691	1.25%	450	PVC	113.14	2.01	0.013	0.94	**318.956**	14%
	E87D	E87C		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	730.691	728.810	1.46%	450	PVC	129.04	2.16	0.013	0.99	**344.222**	13%
	E87C	E87B		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	728.810	727.314	1.60%	450	PVC	93.33	2.27	0.013	0.69	**360.962**	12%
	E87B	E87A		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	727.314	726.315	1.60%	450	PVC	62.56	2.27	0.013	0.46	**360.281**	12%
	E87A	E879		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	726.315	724.575	1.66%	450	PVC	105.07	2.31	0.013	0.76	**366.895**	12%
	E879	E878		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	724.575	724.050	0.54%	450	PVC	97.12	1.32	0.013	1.23	**209.620**	21%
	E878	E877		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	724.050	723.664	0.63%	525	PVC	61.51	1.57	0.013	0.65	**340.684**	13%
	Future	E877																										**0.000**	**43.880**													
	E877	E876		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	723.664	723.197	0.58%	525	PVC	80.47	1.51	0.013	0.89	**327.622**	14%
	E876	E875		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	723.197	722.922	0.53%	750	PVC	52.08	1.83	0.013	0.47	**808.973**	5%
	Future	E875																											**43.880**													
	E875	E874		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	722.812	722.665	0.34%	750	PVC	43.56	1.46	0.013	0.50	**646.722**	7%
	E874	E873		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	722.635	722.400	0.23%	750	PVC	104.39	1.20	0.013	1.46	**528.211**	8%
	E873	E872		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	722.366	722.308	0.07%	750	PVC	82.88	0.67	0.013	2.07	**294.505**	15%
	E872	E871		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	722.308	722.230	0.07%	750	PVC	111.95	0.67	0.013	2.81	**293.859**	15%
	E871	E870		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	722.230	722.135	0.07%	750	PVC	135.06	0.67	0.013	3.37	**295.258**	15%
	E870	E86F		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**43.880**	**44.271**	722.135	722.068	0.07%	750	PVC	95.92	0.67	0.013	2.40	**294.229**	15%
		SUM	319	829.4						13.47						25.99						16.11																				
		CHECK	OK							OK						OK						OK																				

86-100%	1
100-150%	0
150-250%	0
>250%	0

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NORTH INDUSTRIAL TRUNK SYSTEM

	RESIDENTIAL			COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha		
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha		
Population:	5600											
Residential I/I (l/s/ha)	0.6											
Current Residential Area (ha)	202											

Existing Duty Point (Measured by drawdown tests): Semrau LS 4.9 l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL CONTRIBUTING LOTS	RESIDENTIAL TOTAL CONTRIBUTING LOTS	RESIDENTIAL ASSUMED NUMBER OF PERSONS	RESIDENTIAL Q Average	RESIDENTIAL PEAK FACTOR	RESIDENTIAL I/I ALLOWANCE (l/s)	RESIDENTIAL FLOW (l/s)	COMMERCIAL CONTRIBUTING AREA (ha)	COMMERCIAL TOTAL CONTRIBUTING AREAS	COMMERCIAL Q Average	COMMERCIAL PEAK FACTOR	COMMERCIAL I/I ALLOWANCE (l/s)	COMMERCIAL FLOW (l/s)	HORTICULTURAL CONTRIBUTING AREA (ha)	HORTICULTURAL TOTAL CONTRIBUTING AREAS	HORTICULTURAL Q Average	HORTICULTURAL PEAK FACTOR	HORTICULTURAL I/I ALLOWANCE (l/s)	HORTICULTURAL FLOW (l/s)	INDUSTRIAL CONTRIBUTING AREA (ha)	INDUSTRIAL TOTAL CONTRIBUTING AREAS	INDUSTRIAL Q Average	INDUSTRIAL PEAK FACTOR	INDUSTRIAL I/I ALLOWANCE (l/s)	INDUSTRIAL FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																														new data invert issue											
HIGHWAY AVE	EB43	EB42	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.69	0.69	0.0725	1.000	0.014	**0.086**			**0.086**	743.400	742.990	0.48%	200	PVC	85.23	0.72	0.013	1.96	**22.748**	0%
	EB42	EB41	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.27	0.96	0.1008	1.000	0.019	**0.120**			**0.120**	742.970	742.587	0.44%	200	PVC	86.34	0.70	0.013	2.07	**21.845**	1%
	EB41	EB40	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.29	1.25	0.1313	1.000	0.025	**0.156**			**0.156**	742.557	742.456	0.41%	200	PVC	24.5	0.67	0.013	0.61	**21.059**	1%
9 ST	EB3F	EB40	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.89	1.89	0.756	1.000	0.378	**1.134**	0	0	0	1.000	0.000	**0.000**			**1.134**	743.310	742.500	0.83%	200	PVC	98.02	0.95	0.013	1.72	**29.815**	4%
HIGHWAY AVE	EB40	EB3E	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	1.89	0.756	1.000	0.378	**1.134**	0.78	2.03	0.2132	1.000	0.041	**0.254**			**1.388**	742.446	741.880	0.49%	200	PVC	115.69	0.73	0.013	2.64	**22.941**	6%
	EB3E	DA80	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	1.89	0.756	1.000	0.378	**1.134**	0	2.03	0.2132	1.000	0.041	**0.254**			**1.388**	741.920	741.824	0.41%	200	VCT	23.17	0.58	0.015	0.66	**18.297**	8%
	DA80	13991	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	1.89	0.756	1.000	0.378	**1.134**	0.35	2.38	0.2499	1.000	0.048	**0.298**			**1.432**	741.804	741.339	0.41%	200	VCT	112.53	0.58	0.015	3.22	**18.272**	8%
	DA89	DA8A	0	0	0	0	1.000	0.000	**0.000**	0.78	0.78	0.281	1.000	0.047	**0.328**	0.39	0.39	0.156	1.000	0.078	**0.234**	0	0	0	1.000	0.000	**0.000**			**0.562**	742.968	742.518	0.50%	200	VCT	89.97	0.64	0.015	2.34	**20.103**	3%
	DA8A	DA82	0	0	0	0	1.000	0.000	**0.000**	0	0.78	0.281	1.000	0.047	**0.328**	0	0.39	0.156	1.000	0.078	**0.234**	4.09	4.09	0.4295	1.000	0.082	**0.511**			**1.073**	742.478	741.960	0.51%	200	VCT	101.11	0.65	0.015	2.60	**20.346**	5%
	DA82	DA84	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	0.39	0.156	1.000	0.078	**0.234**	0.38	4.47	0.4694	1.000	0.089	**0.559**			**1.301**	741.920	741.658	0.45%	200	VCT	57.63	0.61	0.015	1.57	**19.166**	7%
	DA84	13991	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	0.39	0.156	1.000	0.078	**0.234**	0.35	4.82	0.5061	1.000	0.096	**0.603**			**1.345**	741.648	741.319	0.40%	200	VCT	81.41	0.58	0.015	2.36	**18.070**	7%
11 ST	DA83	DA82	0	0	0	0	1.000	0.000	**0.000**	0.43	0.43	0.155	1.000	0.026	**0.181**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**0.181**	742.247	741.940	0.41%	200	VCT	74.86	0.58	0.015	2.15	**18.203**	1%
SASKATCHEWAN DR	13991	D90B	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	2.28	0.912	1.000	0.456	**1.368**	0.75	7.95	0.8348	1.000	0.159	**0.994**			**2.870**	741.299	740.919	0.50%	200	VCT	76.09	0.64	0.015	1.98	**20.088**	14%
	D90B	D90A	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	2.28	0.912	1.000	0.456	**1.368**	0	7.95	0.8348	1.000	0.159	**0.994**			**2.870**	740.899	740.381	0.44%	200	VCT	117.79	0.60	0.015	3.27	**18.850**	15%
	D90A	D909	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	2.28	0.912	1.000	0.456	**1.368**	0	7.95	0.8348	1.000	0.159	**0.994**			**2.870**	740.371	740.078	0.36%	200	VCT	81.25	0.54	0.015	2.49	**17.070**	17%
	D909	D908	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	3.9	6.18	2.472	1.000	1.236	**3.708**	0	7.95	0.8348	1.000	0.159	**0.994**			**5.210**	740.078	739.494	0.50%	200	VCT	117.3	0.64	0.015	3.06	**20.057**	26%
	D908	D901	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0.4	6.58	2.632	1.000	1.316	**3.948**	0	7.95	0.8348	1.000	0.159	**0.994**			**5.450**	739.494	737.906	1.81%	200	VCT	87.77	1.22	0.015	1.20	**38.235**	14%
	D901	D900	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0.68	7.26	2.904	1.000	1.452	**4.356**	0.95	8.9	0.9345	1.000	0.178	**1.113**			**5.977**	737.906	737.434	0.42%	300	VCT	112.05	0.77	0.015	2.43	**54.394**	11%
	D900	D8FF	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0.48	7.74	3.096	1.000	1.548	**4.644**	0	8.9	0.9345	1.000	0.178	**1.113**			**6.265**	737.404	736.870	0.52%	300	VCT	103.14	0.85	0.015	2.02	**60.303**	10%
	DA7F	D8FF	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.65	1.65	0.1733	1.000	0.033	**0.206**			**0.206**	737.115	736.880	0.26%	300	VCT	89.32	0.61	0.015	2.45	**42.987**	0%
	D8FF	D8FE	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	0	10.55	1.1078	1.000	0.211	**1.319**			**6.471**	736.870	736.194	1.13%	300	VCT	59.58	1.26	0.015	0.79	**89.270**	7%
	D8FE	D8FD	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	1.7	12.25	1.2863	1.000	0.245	**1.531**			**6.683**	736.194	735.147	1.10%	300	VCT	94.79	1.25	0.015	1.27	**88.079**	8%
	D8FD	D8FC	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	1.1	13.35	1.4018	1.000	0.267	**1.669**			**6.821**	735.147	734.256	0.95%	300	VCT	93.63	1.16	0.015	1.35	**81.755**	8%
	D8FC	D8FB	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	0	13.35	1.4018	1.000	0.267	**1.669**			**6.821**	734.256	733.243	1.07%	300	VCT	94.48	1.23	0.015	1.28	**86.779**	8%
	D8FB	D8FA	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	1.53	14.88	1.5624	1.000	0.298	**1.860**			**7.012**	733.243	732.850	0.49%	300	VCT	79.45	0.83	0.015	1.59	**58.943**	12%
	D8FA	D89D	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	0.37	15.25	1.6013	1.000	0.305	**1.906**			**7.058**	734.493	732.850	1.97%	300	VCT	83.3	1.67	0.015	0.83	**117.700**	6%
PEMBINA DR/CRES	D910	D911	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.85	0.85	0.34	1.000	0.170	**0.510**	0	0	0	1.000	0.000	**0.000**			**0.510**	740.684	739.733	1.02%	200	VCT	92.96	0.92	0.015	1.69	**28.751**	2%
	D911	D912	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.8	0.8	0.084	1.000	0.016	**0.100**			**0.610**	739.733	738.907	0.87%	200	VCT	94.44	0.85	0.015	1.86	**26.584**	2%
	D912	D913	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	1.56	2.36	0.2478	1.000	0.047	**0.295**			**0.805**	738.907	738.126	0.82%	200	VCT	95.54	0.82	0.015	1.95	**25.700**	3%
	D913	D904	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.9	3.26	0.3423	1.000	0.065	**0.408**			**0.918**	738.126	737.557	0.95%	200	VCT	59.72	0.88	0.015	1.13	**27.746**	3%
	D910	D902	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.91	0.91	0.0956	1.000	0.018	**0.114**			**0.114**	740.684	740.013	1.12%	200	VCT	59.99	0.96	0.015	1.04	**30.063**	0%
	D902	D903	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.91	0.0956	1.000	0.018	**0.114**			**0.114**	740.013	738.766	1.12%	200	VCT	111.58	0.96	0.015	1.94	**30.050**	0%
	D903	D904	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.95	1.86	0.1953	1.000	0.037	**0.233**			**0.233**	738.766	737.557	1.18%	200	VCT	102.73	0.98	0.015	1.74	**30.837**	1%
	D904	D905	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.93	6.05	0.6353	1.000	0.121	**0.756**			**1.266**	737.557	736.830	1.22%	200	VCT	59.64	1.00	0.015	1.00	**31.384**	4%
	D905	D906	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	1.14	7.19	0.755	1.000	0.144	**0.899**			**1.409**	736.830	736.442	0.41%	200	VCT	93.57	0.58	0.015	2.68	**18.304**	8%
	D906	D907	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.37	7.56	0.7938	1.000	0.151	**0.945**			**1.455**	736.442	735.950	0.61%	200	VCT	80.07	0.71	0.015	1.88	**22.282**	7%
	D907	D89C	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.43	7.99	0.839	1.000	0.160	**0.999**			**1.509**	735.950	735.413	0.65%	200	VCT	82.65	0.73	0.015	1.89	**22.912**	7%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NORTH INDUSTRIAL TRUNK SYSTEM

	RESIDENTIAL		COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580		Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6		I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600										
Residential I/I (l/s/ha)	0.6										
Current Residential Area (ha)	202										

Existing Duty Point (Measured by drawdown tests)		
Semrau LS	4.9	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																			
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE FLOW (l/s)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																															new data										
																															invert issue										
BROADWAY AVE	47104	DA8D	0	0	0	0	1.000	0.000	**0.000**	0.57	0.57	0.205	1.000	0.034	**0.239**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**0.239**	740.450	739.240	1.66%	200	PVC	72.99	1.34	0.013	0.91	**42.229**	1%
	DA8D	DA8C	0	0	0	0	1.000	0.000	**0.000**	0	0.57	0.205	1.000	0.034	**0.239**	0	0	0	1.000	0.000	**0.000**	0.56	0.56	0.0588	1.000	0.011	**0.070**			**0.309**	739.182	738.171	0.92%	200	VCT	110.18	0.87	0.015	2.12	**27.229**	1%
	DA8C	D89B	0	0	0	0	1.000	0.000	**0.000**	1.5	2.07	0.745	1.000	0.124	**0.869**	0	0	0	1.000	0.000	**0.000**	0.55	1.11	0.1166	1.000	0.022	**0.139**			**1.008**	738.151	737.123	0.93%	200	VCT	110.24	0.87	0.015	2.10	**27.449**	4%
	D89B	D89C	0	0	0	0	1.000	0.000	**0.000**	0	2.07	0.745	1.000	0.124	**0.869**	0	0	0	1.000	0.000	**0.000**	1.79	2.9	0.3045	1.000	0.058	**0.363**			**1.232**	736.953	735.413	1.41%	200	VCT	109.44	1.07	0.015	1.70	**33.719**	4%
	D89C	D89D	0	0	0	0	1.000	0.000	**0.000**	0	2.07	0.745	1.000	0.124	**0.869**	0	0.85	0.34	1.000	0.170	**0.510**	0	10.89	1.1435	1.000	0.218	**1.361**			**2.741**	735.413	734.483	0.78%	200	VCT	119.92	0.80	0.015	2.51	**25.032**	11%
	D89D	DAD4	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	4.79	30.93	3.2477	1.000	0.619	**3.866**			**10.398**	734.473	731.834	2.74%	300	VCT	96.24	1.96	0.015	0.82	**138.779**	7%
	DAD4	D899	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.64	32.57	3.4199	1.000	0.651	**4.071**			**10.603**	731.834	731.242	0.71%	300	VCT	83.36	1.00	0.015	1.39	**70.626**	15%
DIRKSON DR	DA12	DA13	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.33	2.33	0.2447	1.000	0.047	**0.291**			**0.291**	739.779	738.897	0.61%	250	PVC	145.6	0.94	0.013	2.57	**46.284**	1%
	DA13	DA14	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	7.85	10.18	1.0689	1.000	0.204	**1.273**			**1.273**	738.867	738.117	0.60%	250	PVC	124.71	0.94	0.013	2.21	**46.117**	3%
	DA14	DA15	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.92	12.1	1.2705	1.000	0.242	**1.513**			**1.513**	738.087	737.301	0.60%	250	PVC	130.9	0.94	0.013	2.32	**46.081**	3%
	DA15	DA16	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.84	14.94	1.5687	1.000	0.299	**1.868**			**1.868**	737.271	736.105	1.01%	250	PVC	115.32	1.22	0.013	1.58	**59.797**	3%
	DA16	DA17	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	8.09	23.03	2.4182	1.000	0.461	**2.879**			**2.879**	736.075	735.058	0.99%	250	PVC	102.83	1.20	0.013	1.42	**59.140**	5%
	DA17	DA18	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	23.03	2.4182	1.000	0.461	**2.879**			**2.879**	735.028	734.583	0.60%	250	PVC	74.2	0.94	0.013	1.32	**46.053**	6%
	DA18	DA19	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.57	25.6	2.688	1.000	0.512	**3.200**			**3.200**	734.553	733.936	0.60%	250	PVC	102.71	0.94	0.013	1.82	**46.091**	7%
	DA19	DA1A	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	4.05	29.65	3.1133	1.000	0.593	**3.706**			**3.706**	733.908	733.190	0.60%	250	PVC	119.79	0.94	0.013	2.13	**46.040**	8%
	DA1A	D972	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	29.65	3.1133	1.000	0.593	**3.706**			**3.706**	733.150	732.670	0.40%	250	PVC	119.9	0.77	0.013	2.61	**37.626**	10%
	D973	D972	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	7.25	7.25	0.7613	1.000	0.145	**0.906**			**0.906**	733.590	732.720	0.73%	250	PVC	119.29	1.03	0.013	1.92	**50.785**	2%
ELBOW DR	D972	D971	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	3.33	40.23	4.2242	1.000	0.805	**5.029**			**5.029**	732.620	732.300	0.28%	200	PVC	115.34	0.55	0.013	3.50	**17.276**	29%
	D971	D970	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.91	42.14	4.4247	1.000	0.843	**5.268**			**5.268**	732.300	731.990	0.26%	200	PVC	119.73	0.53	0.013	3.76	**16.689**	32%
	D970	D96F	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.36	44.5	4.6725	1.000	0.890	**5.563**			**5.563**	731.990	731.730	0.22%	200	PVC	120.81	0.48	0.013	4.16	**15.216**	37%
	D96F	D96E	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.59	46.09	4.8395	1.000	0.922	**5.761**			**5.761**	731.730	731.440	0.27%	200	PVC	108.78	0.54	0.013	3.36	**16.935**	34%
	D96E	D899	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.45	48.54	5.0967	1.000	0.971	**6.068**			**6.068**	731.430	731.232	0.19%	200	PVC	103.72	0.46	0.013	3.79	**14.330**	42%
	D899	D898	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.62	82.73	8.6867	1.000	1.655	**10.341**			**16.873**	731.242	729.319	1.05%	300	VCT	182.63	1.22	0.015	2.50	**85.997**	20%
20 ST	D897	D898	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.74	0.74	0.0777	1.000	0.015	**0.093**			**0.093**	731.549	729.369	2.11%	300	VCT	103.48	1.72	0.015	1.00	**121.642**	0%
	Future	D898																										**0.000**													
	D898	D9A3	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.02	84.49	8.8715	1.000	1.690	**10.561**	**0.000**		**17.093**	729.309	729.055	0.22%	300	VCT	116.17	0.55	0.015	3.49	**39.188**	44%
	D9A3	D915	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	0.36	84.85	8.9093	1.000	1.697	**10.606**	**0.000**		**17.138**	729.025	728.733	0.24%	300	VCT	119.88	0.59	0.015	3.41	**41.362**	41%
	D915	D887	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	0	84.85	8.9093	1.000	1.697	**10.606**	**0.000**		**17.138**	728.703	728.557	0.12%	300	VCT	119.85	0.41	0.015	4.83	**29.251**	59%
INDUSTRIAL DR	D88E	D88D	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.46	1.46	0.1533	1.000	0.029	**0.183**			**0.183**	733.352	732.079	1.21%	200	VCT	105.54	0.99	0.015	1.77	**31.218**	1%
	D88D	D88C	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.44	1.9	0.1995	1.000	0.038	**0.238**			**0.238**	732.039	731.686	0.48%	200	VCT	73.67	0.63	0.015	1.96	**19.676**	1%
	D88C	D889	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.35	2.25	0.2363	1.000	0.045	**0.281**			**0.281**	731.676	730.921	0.86%	200	VCT	87.87	0.84	0.015	1.75	**26.349**	1%
	D889	D888	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	3.38	5.63	0.5912	1.000	0.113	**0.704**			**0.704**	730.931	730.135	0.92%	200	VCT	86.07	0.87	0.015	1.65	**27.336**	3%
	D888	D887	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.73	6.36	0.6678	1.000	0.127	**0.795**			**0.795**	730.115	729.727	0.68%	200	VCT	57.2	0.75	0.015	1.28	**23.411**	3%
20 ST	D887	D914	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	0	91.21	9.5771	1.000	1.824	**11.401**	**0.000**		**17.933**	728.527	728.186	0.22%	300	VCT	151.97	0.56	0.015	4.51	**39.699**	45%
	D914	D91B	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.48	92.69	9.7325	1.000	1.854	**11.586**	**0.000**		**18.118**	728.186	727.825	0.23%	300	VCT	155.95	0.57	0.015	4.56	**40.322**	45%
	D91B	D9A4	0	0	0	0	1.000	0.000	**0.000**	0	3.78	1.361	1.000	0.227	**1.588**	0	8.59	3.436	1.000	1.718	**5.154**	0	97.26	10.212	1.000	1.945	**12.158**	**0.000**		**18.899**	727.825	725.730	2.22%	300	VCT	94.24	1.77	0.015	0.89	**124.956**	15%
HIGHWAY AVE	D919	D918	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**0.000**	737.660	736.350	1.44%	200	VCT	90.85	1.09	0.015	1.39	**34.133**	0%
	D918	D88F	0	0	0	0	1.000	0.000	**0.000**	0.5	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	0.24	0.24	0.0252	1.000	0.005	**0.030**			**0.240**	736.350	734.938	0.58%	200	VCT	241.49	0.69	0.015	5.82	**21.736**	1%
	D88F	D917	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	1.93	2.17	0.2279	1.000	0.043	**0.271**			**0.481**	734.918	730.891	1.67%	200	VCT	241.24	1.17	0.015	3.44	**36.726**	1%
	D917	D916	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	1.2	3.37	0.3539	1.000	0.067	**0.421**			**0.631**	730.871	729.552	1.10%	200	VCT	120.07	0.95	0.015	2.11	**29.793**	2%
	D916	D91A	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	1.2	4.57	0.4799	1.000	0.091	**0.571**			**0.781**	729.522	728.277	1.04%	200	VCT	119.77	0.92	0.015	2.16	**28.981**	3%
	D91A	D91B	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	0	4.57	0.4799	1.000	0.091	**0.571**			**0.781**	728.247	727.825	0.35%	200	VCT	119.56	0.54	0.015	3.71	**16.888**	5%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NORTH INDUSTRIAL TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured by drawdown tests)

Semrau LS	4.9	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																			
																															new data										
																															invert issue										
SOUTH HIGHWAAY DR	D983	D984	0	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000	1.43	1.43	0.1502	1.000	0.029	0.179			0.179	735.308	734.392	0.90%	200	PVC	101.42	0.99	0.013	1.70	31.170	1%
	D984	D985	0	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000	1.49	2.92	0.3066	1.000	0.058	0.365			0.365	734.392	733.436	0.80%	200	PVC	119.63	0.93	0.013	2.14	29.320	1%
	D985	D986	0	0	0	0	1.000	0.000	0.000	0.86	0.86	0.31	1.000	0.052	0.361	0	0	0	1.000	0.000	0.000	0	2.92	0.3066	1.000	0.058	0.365			0.726	733.436	731.642	1.48%	200	PVC	121.09	1.27	0.013	1.59	39.922	2%
	D986	D987	0	0	0	0	1.000	0.000	0.000	0	0.86	0.31	1.000	0.052	0.361	0	0	0	1.000	0.000	0.000	0	2.92	0.3066	1.000	0.058	0.365			0.726	731.642	730.460	0.93%	200	PVC	126.53	1.01	0.013	2.09	31.700	2%
	D987	D988	0	0	0	0	1.000	0.000	0.000	2.24	3.1	1.116	1.000	0.186	1.302	0	0	0	1.000	0.000	0.000	0	2.92	0.3066	1.000	0.058	0.365			1.667	730.460	729.107	1.08%	200	PVC	125.82	1.08	0.013	1.94	34.012	5%
	D988	D989	0	0	0	0	1.000	0.000	0.000	0	3.1	1.116	1.000	0.186	1.302	0	0	0	1.000	0.000	0.000	0	2.92	0.3066	1.000	0.058	0.365			1.667	729.107	726.836	2.23%	200	PVC	101.68	1.56	0.013	1.09	49.017	3%
	D989	D9A4	0	0	0	0	1.000	0.000	0.000	2.33	5.43	1.955	1.000	0.326	2.281	0	0	0	1.000	0.000	0.000	0	2.92	0.3066	1.000	0.058	0.365			2.646	726.846	726.040	0.67%	200	VCT	120.26	0.74	0.015	2.71	23.271	11%
20 ST	D9A4	15216	0	0	0	0	1.000	0.000	0.000	0	9.21	3.316	1.000	0.553	3.868	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000		21.545	725.730	724.560	1.45%	300	VCT	80.7	1.43	0.015	0.94	100.911	21%
	15216	15203	0	0	0	0	1.000	0.000	0.000	0	9.21	3.316	1.000	0.553	3.868	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000		21.545	724.550	723.800	0.71%	300	PVC	105.99	1.15	0.013	1.54	81.344	26%
SAAMIS DR	D98B	D98C	0	0	0	0	1.000	0.000	0.000	3.2	3.2	1.152	1.000	0.192	1.344	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000			1.344	721.933	721.591	0.61%	200	PVC	55.83	0.82	0.013	1.14	25.670	5%
	D98C	D98D	0	0	0	0	1.000	0.000	0.000	0	3.2	1.152	1.000	0.192	1.344	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000			1.344	721.511	720.996	0.44%	200	PVC	117.71	0.69	0.013	2.84	21.695	6%
	D98D	D98E	0	0	0	0	1.000	0.000	0.000	2.94	6.14	2.21	1.000	0.368	2.579	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000			2.579	720.956	720.411	0.45%	200	PVC	120.69	0.70	0.013	2.87	22.040	12%
	D98E	D98F	0	0	0	0	1.000	0.000	0.000	1.01	7.15	2.574	1.000	0.429	3.003	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000			3.003	720.391	717.068	2.75%	200	PVC	121.05	1.73	0.013	1.17	54.342	6%
	D990	D98F	0	0	0	0	1.000	0.000	0.000	3.68	3.68	1.325	1.000	0.221	1.546	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000			1.546	716.660	716.028	0.52%	200	PVC	121.71	0.75	0.013	2.70	23.635	7%
	LS	D98A	0	0	0	0	1.000	0.000	0.000	0	10.83	3.899	1.000	0.650	4.549	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000			4.549				75	PVC	542.86		0.013		LS CAPACITY GOOD	
	D98A	15203	0	0	0	0	1.000	0.000	0.000	1.14	1.14	0.41	1.000	0.068	0.479	0	0	0	1.000	0.000	0.000	0	0	0	1.000	0.000	0.000		4.900	5.379	724.069	723.980	0.34%	200	PVC	26.33	0.61	0.013	0.72	19.069	28%
TO END	15203	15208	0	0	0	0	1.000	0.000	0.000	0	10.35	3.726	1.000	0.621	4.347	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000	4.900	26.924	723.760	723.260	0.66%	300	PVC	76.28	1.11	0.013	1.15	78.291	34%
	15208	D94D	0	0	0	0	1.000	0.000	0.000	0	10.35	3.726	1.000	0.621	4.347	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000	4.900	26.924	723.280	722.933	0.83%	300	PVC	41.71	1.25	0.013	0.56	88.201	31%
	D94D	D94C	0	0	0	0	1.000	0.000	0.000	0	10.35	3.726	1.000	0.621	4.347	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000	4.900	26.924	722.933	722.726	0.17%	300	VCT	118.84	0.49	0.015	4.00	34.977	77%
	D94C	D94B	0	0	0	0	1.000	0.000	0.000	0	10.35	3.726	1.000	0.621	4.347	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000	4.900	26.924	722.666	722.560	0.07%	375	VCT	151.07	0.36	0.015	6.91	40.251	67%
	D94B	D94A	0	0	0	0	1.000	0.000	0.000	0	10.35	3.726	1.000	0.621	4.347	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000	4.900	26.924	722.520	722.303	0.15%	375	VCT	148.74	0.53	0.015	4.72	58.040	46%
	D94A	D949	0	0	0	0	1.000	0.000	0.000	0	10.35	3.726	1.000	0.621	4.347	0	8.59	3.436	1.000	1.718	5.154	0	100.18	10.519	1.000	2.004	12.523	0.000	4.900	26.924	722.263	721.984	0.18%	375	VCT	150.82	0.59	0.015	4.25	65.355	41%
		SUM	0							21.2						8.59						100.2																		86-100%	0
		CHECK	OK							OK						OK						OK																		100-150%	0
																																								150-250%	0
																																								>250%	0

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

TO CITY GATE

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen	0.4	l/s/ha	Gen	0.11	l/s/ha
Assumed Persons Per household	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600.0									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

MANNINGS "n" VALUE

PVC	0.013
VCT	0.015

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																						
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**	
																															new data												
																															invert issue												.
	DA03	E86F	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**0.000**	**48.070**	**161.779**	722.377	722.038	0.78%	375	VCT	43.5	1.21	0.015	0.60	**134.142**	121%	722.377
	E86F	D949	0	1504.00	3910.4	26.2504	1.000	84.632	**110.883**		7.66	2.7576	1.000	0.460	**3.217**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**0.000**	**91.950**	**206.050**	722.028	721.994	0.87%	375	VCT	3.9	1.28	0.015	0.05	**141.878**	145%	722.028
	D949	DA0F	0	1504.00	3910.4	26.2504	1.000	84.632	**110.883**		18.01	6.4836	1.000	1.081	**7.564**		8.59	3.436	1.000	1.718	**5.154**		100.18	10.52	1.000	2.004	**12.523**	**0.000**	**96.850**	**232.973**	721.984	721.500	1.45%	375	VCT	33.34	1.66	0.015	0.34	**183.083**	127%	721.984
			sum	1504.00							18.01						8.59						100.18																	86-100%	0	
			check	OK							OK						OK						OK																	100-150%	3	
																																								150-250%	0	
																																								>250%	0	

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

FUTURE FLOWS

(Stantec Eastside FSR)

RESIDENTIAL		COMMERCIAL		INDUSTRIAL
Residential Average per capita daily flow:	0 l/cap/day	Gen 0 l/s/ha		Gen. 0 l/s/ha
Population Density:	29.7 persons/ha	I/I 0 l/s/ha		I/I 0 l/s/ha
Residential I/I (l/s/ha)	0 l/s/ha			
Low Density	24 persons/ha			
		Total Population:	**14690.8**	

		RESIDENTIAL							COMMERCIAL						INDUSTRIAL/HORTICULTURAL						
SEGMENT	DOWNSTREAM MH	TOTAL AREA (ha)	TOTAL CONTRIBUTING LOTS	Total Population	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**TOTAL**
NORTHSIDE	D898			0.0	0.0	4.5	0.0	**0**	10	10.00	0	1.000	0.000	**0.000**	368.90	368.900	0	1.000	0.000	**0.000**	**0.000**
EASTSIDE	E883	30.74	30.74	913.0	0	3.825	0.000	**0.000**	8.27	8.27	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**
	E877	75.53	75.53	2243.2	0	3.546	0.000	**0.000**	25.21	25.21	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**
	DA04	15.98	15.98	474.6	0	3.986	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**
	DA0A	36.68	36.68	1089.4	0	3.776	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**
NORTH GATEWAY	D9D4	0	0	0.0	0	4.500	0.000	**0.000**	25	25.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**
NORTHEND	D9B2	50	50	1485.0	0	3.683	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	20.00	20.000	0	1.000	0.000	**0.000**	**0.000**
WESTEND	D9B2	20	20	480.0	0	3.983	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**
BAYLISS	DA02	0	0	0.0	0	4.500	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	20.00	20.000	0	1.000	0.000	**0.000**	**0.000**
RIVER TERRACE	D8BB	100	100	2400.0	0	3.523	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**0.000**

TOWN OF REDCLIFF - SANITARY SEWER MODEL

FUTURE CAPACITY ANALYSIS (ULTIMATE 40 YEAR BUILDOUT)

Project: Redcliff Sanitary Waste Water Study
Client: Town of Redcliff
Job No: 3400-003-00
Date: April 22, 2013
Prepared By: Blake Smith / Patrick Boyd
Checked By:

Select the Desired Existing and Future Scenarios from the Drop Down Menus in the Scenarios Column

	Scenarios	Residential (l/cap/day)	Commercial (l/s/ha)	Horticultural (l/s/ha)	Industrial (l/s/ha)	Residential I/I (l/s/ha)	Commercial I/I (l/s/ha)	Horticultural I/I (l/s/ha)	Industrial I/I (l/s/ha)
Existing	Calibrated Peak Wet Flow	580	0.360	0.400	0.105	0.600	0.060	0.200	0.020
Future	Recommended	300	0.2	N/A	0.15	0.16	0.1	N/A	0.1
Existing Manual	Enter Generation Inputs as Desired and Select Manual in the Above Drop Downs:	250	0.001	0.001	0.001	0.1	0.1	0.1	0.1
Future Manual		1	2	N/A	4	6	7	N/A	9

Mannings "n" Value
PVC: 0.013
VCT: 0.015

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

	FLOWS (l/s)
NORTH INDUSTRIAL TRUNK	262.57
NORTHWEST TRUNK	221.69
SOUTH TRUNK	249.18
TO CITY GATE	**733.44**

	North Industrial	Northwest	South	To City Gate	SUM
86-100%	0	1	4	0	5
100-150%	0	11	19	0	30
150-250%	1	4	15	1	21
>250%	13	1	0	2	16
					72

EXISTING	Residential (l/cap/day)	Commercial (l/s/ha)	Horticultural (l/s/ha)	Industrial (l/s/ha)	Residential I/I (l/s/ha)	Commercial I/I (l/s/ha)	Horticultural I/I	Industrial I/I
Calibrated Average Dry Flow	260	0.18	0.20	0.035	0.00	0.00	0.00	0.00
Calibrated Peak Dry Flow	580	0.36	0.40	0.105	0.00	0.00	0.00	0.00
Calibrated Peak Wet Flow	580	0.36	0.40	0.105	0.60	0.06	0.20	0.02
Town of Redcliff	340	0.46	0.23	0.230	0.20	0.28	0.28	0.28
MSSM / ESRD	454	0.46	0.35	0.350	0.00	0.28	0.28	0.28
Lethbridge	400	0.23	0.35	0.350	0.64	0.23	0.35	0.35
ESRD	340	0.46	0.35	0.350	0.28	0.28	0.28	0.28
RECOMMENDED	300	0.20	0.20	0.150	0.60	0.06	0.20	0.02
Manual Inputs	250	0.00	0.00	0.00	0.10	0.10	0.10	0.10
FUTURE	**Residential (l/cap/day)**	**Commercial (l/s/ha)**	**Horticultural (l/s/ha)**	**Industrial (l/s/ha)**	**Residential I/I (l/s/ha)**	**Commercial I/I (l/s/ha)**	**Horticultural I/I**	**Industrial I/I**
Recommended	300	0.20	0.20	0.150	0.16	0.10	0.10	0.10
Town of Redcliff	340	0.46	0.23	0.230	0.20	0.28	0.28	0.28
MSSM / ESRD	454	0.46	0.35	0.350	0.00	0.28	0.28	0.28
Lethbridge	400	0.23	0.35	0.350	0.16	0.09	0.09	0.09
ESRD	340	0.46	0.35	0.350	0.28	0.28	0.28	0.28
Manual Inputs	1	2.00	N/A	4.00	6.00	7.00	N/A	9.00
25% Buildout	300	0.20	0.20	0.150	0.16	0.10	0.10	0.10
50% Buildout	300	0.20	0.20	0.150	0.16	0.10	0.10	0.10
No	0	0	0	0	0	0	0	0

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	28.05494	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	RESIDENTIAL: TOTAL CONTRIBUTING LOTS	RESIDENTIAL: ASSUMED NUMBER OF PERSONS	RESIDENTIAL: Q Average	RESIDENTIAL: PEAK FACTOR	RESIDENTIAL: I/I ALLOWANCE (l/s)	RESIDENTIAL: FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	COMMERCIAL: TOTAL CONTRIBUTING AREAS (ha)	COMMERCIAL: Q Average	COMMERCIAL: PEAK FACTOR	COMMERCIAL: I/I ALLOWANCE (l/s)	COMMERCIAL: FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	HORTICULTURAL: TOTAL CONTRIBUTING AREAS (ha)	HORTICULTURAL: Q Average	HORTICULTURAL: PEAK FACTOR	HORTICULTURAL: I/I ALLOWANCE (l/s)	HORTICULTURAL: FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	INDUSTRIAL: TOTAL CONTRIBUTING AREAS (ha)	INDUSTRIAL: Q Average	INDUSTRIAL: PEAK FACTOR	INDUSTRIAL: I/I ALLOWANCE (l/s)	INDUSTRIAL: FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																														new data											
																														invert issue											
FLOWS TO FACTORY LIFT STATION NORTH OF BROADWAY	D9F0	D9A2	12.00	12.00	31.2	0.20944	1.000	0.675	**0.885**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.885**	747.195	745.734	1.39%	200	PVC	105.090	1.23	0.013	1.42	**38.672**	2%
	D9A2	D950	6.00	18.00	46.8	0.31417	1.000	1.013	**1.327**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.327**	745.734	745.221	0.49%	200	PVC	105.770	0.73	0.013	2.42	**22.842**	6%
	D951	D950	13.00	13.00	33.8	0.2269	1.000	0.732	**0.958**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.958**	747.065	745.221	1.67%	200	VCT	110.190	1.17	0.015	1.57	**36.772**	3%
	D950	D948	0.00	31.00	80.6	0.54106	1.000	1.744	**2.285**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**2.285**	745.501	745.273	0.22%	200	VCT	105.260	0.42	0.015	4.17	**13.229**	17%
	D9E0	D948	3.00	3.00	7.8	0.05236	1.000	0.169	**0.221**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.221**	745.364	745.283	0.12%	200	VCT	68.34	0.31	0.015	3.66	**9.786**	2%
	D948	D946	0.00	47.00	122.2	0.82032	1.000	2.645	**3.465**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**3.465**	745.283	744.835	0.42%	200	VCT	105.550	0.59	0.015	2.98	**18.519**	19%
	D946	D943	0.00	47.00	122.2	0.82032	1.000	2.645	**3.465**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**3.688**	744.835	744.404	0.41%	200	VCT	105.410	0.58	0.015	3.04	**18.176**	20%
	D943	D892	0	66.00	171.6	1.15194	1.000	3.714	**4.866**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**5.088**	744.364	743.943	0.40%	200	VCT	105.990	0.57	0.015	3.10	**17.915**	28%
	D94F	D948	13	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	746.792	745.293	1.38%	200	VCT	108.980	1.06	0.015	1.71	**33.337**	3%
	D945	D946	0	0	0.0	0	1.000	0.000	**0.000**	0.53	0.53	0.1908	1.000	0.032	**0.223**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.223**	747.533	745.445	1.76%	200	VCT	118.940	1.20	0.015	1.65	**37.662**	1%
	D944	D943	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	748.083	744.384	3.36%	200	VCT	109.930	1.66	0.015	1.10	**52.142**	1%
	3A3F6	D943	12	12	31.2	0.20944	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	745.903	744.384	1.32%	200	VCT	115.460	1.04	0.015	1.85	**32.604**	3%
	D893	D892	21	21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.548**	747.048	744.023	2.51%	200	VCT	120.550	1.43	0.015	1.40	**45.028**	3%
	D892	39FD5	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.933	743.826	0.24%	200	VCT	44.910	0.44	0.015	1.69	**13.875**	48%
	39FD5	39FD4	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.816	743.579	0.38%	200	VCT	62.260	0.56	0.015	1.86	**17.538**	38%
	39FD4	39FD3	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.579	743.323	0.39%	200	VCT	65.650	0.56	0.015	1.94	**17.750**	37%
	39FD3	39FD2	0	87.00	226.2	1.51847	1.000	4.896	**6.414**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**6.637**	743.323	741.466	1.67%	200	VCT	111.200	1.17	0.015	1.59	**36.733**	18%
	DA94	39FD3	Clean out		0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	747.580	743.453	3.40%	200	VCT	121.330	1.67	0.015	1.21	**52.425**	0%
	D95E	D9BD	26	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	747.108	745.950	1.04%	300	PVC	111.810	1.39	0.013	1.34	**98.411**	2%
	D9BD	39FD2	16	42	109.2	0.73306	1.000	2.363	**3.096**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.096**	745.870	744.756	0.92%	200	VCT	120.500	0.87	0.015	2.31	**27.331**	11%
	39FD2	LS	0	129.00	335.4	2.25153	1.000	7.259	**9.511**		0.53	0.1908	1.000	0.032	**0.223**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**9.733**	741.406	740.505	0.40%	200	VCT	222.530	0.58	0.015	6.44	**18.087**	54%
	LS	DA94	0	0.00	0.0	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**17.140**	**17.140**			0.00%	100	POLY	222.530				LS CAPACITY GOOD	
MAIN TO SOUTH	D9BD	D9C3	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	747.350	746.760	0.53%	200	VCT	111.280	0.66	0.015	2.82	**20.698**	2%
	D9C3	D963	4	11.00	28.6	0.19199	1.000	0.619	**0.811**	0.33	0.33	0.1188	1.000	0.020	**0.139**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**9.520**	746.745	746.431	0.27%	250	VCT	118.060	0.54	0.015	3.63	**26.579**	36%
	D963	D962	0	11.00	28.6	0.19199	1.000	0.619	**0.811**		0.33	0.1188	1.000	0.020	**0.139**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**9.520**	746.401	745.960	0.40%	250	VCT	110.890	0.66	0.015	2.79	**32.502**	29%
	D962	D961	0	11.00	28.6	0.19199	1.000	0.619	**0.811**	0.24	0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**9.620**	745.930	745.149	0.64%	250	VCT	122.170	0.84	0.015	2.43	**41.207**	23%
	D961	D958	10	21.00	54.6	0.36653	1.000	1.182	**1.548**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**10.358**	745.129	744.070	0.87%	250	VCT	122.150	0.98	0.015	2.08	**47.988**	22%
	D958	D957	10	31.00	80.6	0.54106	1.000	1.744	**2.285**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**11.095**	744.050	743.070	0.97%	250	VCT	101.480	1.03	0.015	1.64	**50.647**	22%
	D957	D999	20	51.00	132.6	0.89014	1.000	2.870	**3.760**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**12.569**	743.050	740.802	1.31%	250	VCT	171.860	1.20	0.015	2.39	**58.944**	21%
	D999	D965	8	59.00	153.4	1.02977	1.000	3.320	**4.350**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**13.159**	740.772	740.355	0.46%	250	VCT	90.840	0.71	0.015	2.13	**34.919**	38%
	D965	D8DC	6	65.00	169.0	1.13449	1.000	3.658	**4.792**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**13.602**	740.335	738.733	2.25%	250	VCT	71.150	1.58	0.015	0.75	**77.335**	18%
	D8DC	D8DD	5	70.00	182.0	1.22176	1.000	3.939	**5.161**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**13.970**	738.523	737.938	0.56%	450	PVC	103.570	1.35	0.013	1.28	**214.273**	7%
	D8DD	D8EA	4	74.00	192.4	1.29157	1.000	4.164	**5.456**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.265**	737.928	737.800	0.17%	450	PVC	77.240	0.73	0.013	1.76	**116.062**	12%
	D8EA	D8EC	5	79.00	205.4	1.37884	1.000	4.445	**5.824**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.634**	737.790	737.706	0.10%	450	PVC	85.180	0.56	0.013	2.52	**89.532**	16%
	D8EC	D8F3	4	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.686	737.677	0.01%	450	PVC	89.200	0.18	0.013	8.26	**28.638**	52%
	D8F3	D8EF	0	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.677	737.530	0.16%	450	PVC	93.510	0.71	0.013	2.19	**113.041**	13%
	D8EF	D8BC	0	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.510	737.409	0.13%	450	PVC	79.490	0.64	0.013	2.07	**101.627**	15%
	D8BC	D8BB	0	83.00	215.8	1.44866	1.000	4.671	**6.119**		0.57	0.2052	1.000	0.034	**0.239**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**8.570**	**14.929**	737.369	737.22	0.14%	450	PVC	103.81	0.68	0.013	2.55	**108.014**	14%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL					
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	Factory LS Flow 1 (50%)	17.14	l/s
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha	Factory LS Flow 2 (50%)		
Population:	5600										Jesmond LS	28.05494	l/s
Residential I/I (l/s/ha)	0.6										Redcliff Way LS	15.64	l/s
Current Residential Area (ha)	202												

Existing Duty Point (Measured from Drawdown Tests)

MANNINGS "n" VALUE: PVC 0.013; VCT 0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
	DA94	D9C3	0	0.00	0.0	0	1.000	0.000	**0.000**		0.000	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**8.570**	746.845	746.840	0.34%	200	VCT	1.490	0.52	0.015	0.05	**16.466**	52%
	DA94	D9EA	7	7.00	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**9.086**	746.840	746.510	0.30%	200	VCT	110.160	0.50	0.015	3.71	**15.558**	58%
WEST SUBDIVISION TO JESMOND LIFT STATION	D95F	D960		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	745.503	744.858	0.69%	200	VCT	93.140	0.75	0.015	2.06	**23.655**	0%
	D960	D959		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	744.818	744.259	0.53%	200	VCT	106.070	0.66	0.015	2.69	**20.635**	0%
	D959	D95A	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	744.209	743.578	0.75%	200	VCT	84.08	0.78	0.015	1.79	**24.625**	3%
	D95A	D956	10	19	49.4	0.33162	1.000	1.069	**1.401**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.401**	743.578	742.659	1.04%	200	VCT	88.11	0.92	0.015	1.59	**29.030**	5%
	D956	D955	2	21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.548**	742.679	740.329	2.24%	200	VCT	105.1	1.35	0.015	1.29	**42.505**	4%
	D99A	D95B		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.34	1.34	0.536	1.000	0.268	**0.804**		0	0	1.000	0.000	**0.000**			**0.804**	741.133	740.689	0.51%	200	VCT	86.47	0.65	0.015	2.22	**20.369**	4%
	D95B	D95C		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		1.34	0.536	1.000	0.268	**0.804**		0	0	1.000	0.000	**0.000**			**0.804**	740.719	740.323	0.46%	200	VCT	85.99	0.61	0.015	2.33	**19.290**	4%
	D954	D95C		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.13	1.13	0.452	1.000	0.226	**0.678**		0	0	1.000	0.000	**0.000**			**0.678**	740.740	740.303	0.41%	200	VCT	105.39	0.58	0.015	3.01	**18.304**	4%
	D95C	D955		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		2.47	0.988	1.000	0.494	**1.482**		0	0	1.000	0.000	**0.000**			**1.482**	740.363	740.319	0.04%	200	VCT	105.84	0.18	0.015	9.56	**5.796**	26%
	D99B	D955		0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	0.82	0.82	0.328	1.000	0.164	**0.492**		0	0	1.000	0.000	**0.000**			**0.492**	742.511	740.349	2.39%	200	PVC	90.33	1.62	0.013	0.93	**50.742**	1%
	D955	290AB		21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**	1.25	4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**4.272**	740.259	739.286	1.08%	200	PVC	90.47	1.08	0.013	1.39	**34.014**	13%
	290AB	D9F1		21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**4.272**	739.276	738.807	0.55%	200	PVC	84.93	0.78	0.013	1.82	**24.373**	18%
	D9F1	DA02	5	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**4.641**	738.820	738.390	0.41%	200	PVC	105.45	0.67	0.013	2.64	**20.944**	22%
	DA02	DA01	6	32	83.2	0.55852	1.000	1.801	**2.359**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**5.083**	738.360	737.960	0.38%	200	PVC	106.39	0.64	0.013	2.77	**20.111**	25%
	DA01	DA00	7	39	101.4	0.68069	1.000	2.195	**2.875**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**			**5.599**	737.930	737.440	0.42%	200	PVC	115.53	0.68	0.013	2.83	**21.360**	26%
	Future	DA02																											**17.000**													
	DA00	D9FF	7	46	119.6	0.80287	1.000	2.588	**3.391**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**	**17.000**		**23.115**	737.414	736.540	0.92%	200	PVC	94.67	1.00	0.013	1.57	**31.514**	73%
	D9FF	F9F9	6	57	148.2	0.99486	1.000	3.207	**4.202**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**	**17.000**		**23.926**	736.500	735.420	1.35%	200	PVC	79.77	1.21	0.013	1.09	**38.163**	63%
	D9FE	D9FF	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	736.740	736.560	0.94%	200	PVC	19.21	1.01	0.013	0.32	**31.749**	1%
	D9FB	D9FA	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	736.270	736.080	0.94%	200	PVC	20.24	1.01	0.013	0.33	**31.778**	1%
	D9FC	D9FA	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	736.362	736.080	1.01%	200	PVC	27.87	1.05	0.013	0.44	**32.992**	1%
	D9FA	D9F9	8	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	736.020	735.420	0.58%	200	PVC	102.66	0.80	0.013	2.14	**25.074**	5%
	D9F3	D9F2	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	738.211	737.910	0.58%	200	PVC	52.29	0.79	0.013	1.10	**24.884**	1%
	D9F2	D9F4	11	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	737.850	737.170	0.41%	200	PVC	166.63	0.67	0.013	4.16	**20.952**	6%
	D9F4	D9F7	4	25	65.0	0.43634	1.000	1.407	**1.843**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.843**	737.138	736.750	0.39%	200	PVC	99.66	0.65	0.013	2.55	**20.465**	9%
	D9F7	D9F8	4	37	96.2	0.64579	1.000	2.082	**2.728**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.728**	736.720	736.510	0.33%	200	PVC	63.07	0.60	0.013	1.74	**18.926**	14%
	D9F8	D9F9	2	39	101.4	0.68069	1.000	2.195	**2.875**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.875**	736.452	735.560	1.03%	200	PVC	86.73	1.06	0.013	1.37	**33.262**	9%
	D9F5	D9F4	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	737.800	737.600	0.98%	200	PVC	20.39	1.03	0.013	0.33	**32.483**	1%
	D9F6	D9F7	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	737.261	737.010	0.88%	200	PVC	28.41	0.98	0.013	0.48	**30.829**	2%
	D9F9	DEF2	1	113	293.8	1.97227	1.000	6.359	**8.331**		0	0	1.000	0.000	**0.000**		4.54	1.816	1.000	0.908	**2.724**		0	0	1.000	0.000	**0.000**	**17.000**		**28.055**	735.370	734.540	1.04%	200	PVC	79.77	1.06	0.013	1.25	**33.456**	84%
	DEF2	D966	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**28.055**	**0.000**				150	PVC	664.69		0.013		LS CAPACITY GOOD	

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Factory LS Flow 1 (50%)	17.14 l/s
Factory LS Flow 2 (50%)	
Jesmond LS	28.05494 l/s
Redcliff Way LS	15.64 l/s

Existing Duty Point (Measured from Drawdown Tests)

MANNINGS "n" VALUE		
PVC	0.013	
VCT	0.015	

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
JESMOND LS TO TRUNK MAIN	D95D	D966	14	14	36.4	0.24435	1.000	0.788	1.032		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.032	740.440	740.100	0.38%	200	PVC	88.93	0.65	0.013	2.30	20.280	5%
	D966	D964	6	20	52.0	0.34907	1.000	1.125	1.475		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	29.529	740.060	739.820	0.33%	200	PVC	72.71	0.60	0.013	2.02	18.844	157%
	D964	D99D	6	26	67.6	0.4538	1.000	1.463	1.917		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	29.972	739.700	739.583	0.16%	200	PVC	74.63	0.41	0.013	3.01	12.986	231%
	D99D	D969	2	28	72.8	0.4887	1.000	1.576	2.064		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	30.119	739.533	739.262	0.59%	200	PVC	46.17	0.80	0.013	0.96	25.128	120%
	D969	D8DB	2	32	83.2	0.55852	1.000	1.801	2.359		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	30.414	739.242	738.800	0.68%	200	PVC	65.06	0.86	0.013	1.26	27.034	113%
	D8DB	D8DE	0	33	85.8	0.57597	1.000	1.857	2.433		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	30.488	738.760	738.492	0.47%	300	VCT	56.7	0.82	0.015	1.16	57.618	53%
	D8DE	13770	6	48	124.8	0.83778	1.000	2.701	3.539		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	31.594	738.612	738.344	0.23%	300	VCT	115.92	0.57	0.015	3.39	40.297	78%
	13770	D8EB	4	52	135.2	0.90759	1.000	2.926	3.834		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	31.889	738.344	738.251	0.18%	250	VCT	51.29	0.45	0.015	1.91	21.946	145%
	D8EB	D8F0	6	58	150.8	1.01231	1.000	3.264	4.276		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	32.331	738.231	738.039	0.19%	250	VCT	103.28	0.45	0.015	3.80	22.222	145%
	D8F0	D8F1	2	60	156.0	1.04722	1.000	3.376	4.424		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	32.478	738.019	737.979	0.21%	250	VCT	19	0.48	0.015	0.66	23.647	137%
	D8F1	D8ED	2	62	161.2	1.08213	1.000	3.489	4.571		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	32.626	737.979	737.774	0.23%	300	VCT	87.85	0.57	0.015	2.56	40.484	81%
	D8ED	D8BE	2	64	166.4	1.11704	1.000	3.601	4.718		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	32.773	737.774	737.539	0.27%	300	VCT	87.95	0.61	0.015	2.39	43.321	76%
	D8BE	D8BA	2	66	171.6	1.15194	1.000	3.714	4.866		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	32.921	737.579	737.450	0.13%	300	VCT	98.57	0.43	0.015	3.83	30.318	109%
	D8BA	D8BB	1	67	174.2	1.1694	1.000	3.770	4.940		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		28.055	32.995	737.350	737.180	1.27%	300	VCT	13.39	1.34	0.015	0.17	94.431	35%
	D8DC	D8DB	1	1	2.6	0.01745	1.000	0.056	0.074		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.074	738.710	738.523	1.78%	300	VCT	10.48	1.58	0.015	0.11	111.949	0%
	D96A	D969	2	2	5.2	0.03491	1.000	0.113	0.147		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.147	739.432	739.252	0.42%	200	PVC	42.89	0.68	0.013	1.06	21.248	1%
	D96A	D96B	3	3	7.8	0.05236	1.000	0.169	0.221		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.221	739.592	739.172	0.73%	200	PVC	57.38	0.89	0.013	1.07	28.061	1%
	D96B	D8DE	6	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	739.162	738.582	0.54%	200	PVC	107.75	0.77	0.013	2.34	24.063	3%
SW SUB TO TRUNK	D8F2	D8EE	5	5	13.0	0.08727	1.000	0.281	0.369		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.369	738.363	737.952	0.49%	200	VCT	83.49	0.63	0.015	2.19	19.944	2%
	D8EE	D8BD	5	10	26.0	0.17454	1.000	0.563	0.737		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.737	737.932	737.720	0.25%	200	VCT	86.02	0.45	0.015	3.19	14.112	5%
	D8BD	D8BB	1	52	135.2	0.90759	1.000	2.926	3.834		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	3.834	737.660	737.150	0.48%	200	VCT	106.49	0.63	0.015	2.83	19.671	19%
	D9A8	D9A9	4	4	10.4	0.06981	1.000	0.225	0.295		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	0.295	740.169	739.919	0.49%	200	PVC	50.79	0.73	0.013	1.16	23.011	1%
	D9A9	D8C1	3	20	52.0	0.34907	1.000	1.125	1.475		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	1.475	739.899	739.528	0.40%	200	PVC	93.18	0.66	0.013	2.36	20.696	7%
	D8C1	D8C0	1	21	54.6	0.36653	1.000	1.182	1.548		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	1.548	739.448	739.267	0.86%	200	PVC	20.98	0.97	0.013	0.36	30.464	5%
	D8C0	D8BF	10	31	80.6	0.54106	1.000	1.744	2.285		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	2.285	739.097	738.486	0.80%	200	VCT	76.16	0.81	0.015	1.57	25.460	9%
	D8BF	D8BD	10	41	106.6	0.7156	1.000	2.307	3.023		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640	3.023	738.446	737.850	0.78%	200	VCT	76.1	0.80	0.015	1.58	25.156	12%
	D9A5	D9A9	13	13	33.8	0.2269	1.000	0.732	0.958		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.958	740.407	739.939	0.40%	200	PVC	116.05	0.66	0.013	2.92	20.828	5%
Redcliff Way LS	EAF2	EAF3	7	7	18.2	0.12218	1.000	0.394	0.516		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.516	736.539	736.489	0.47%	200	PVC	10.7	0.71	0.013	0.25	22.421	2%
	EAF3	EAF8	17	24	62.4	0.41889	1.000	1.351	1.769		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.769	736.490	735.970	0.32%	250	PVC	163.69	0.68	0.013	4.00	33.517	5%
	EAF8	EAFA	7	31	80.6	0.54106	1.000	1.744	2.285		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.285	735.970	735.782	0.28%	250	PVC	67.77	0.64	0.013	1.77	31.321	7%
	EAFA	160C7	0	91	236.6	1.58829	1.000	5.121	6.709		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			6.709	735.782	735.550	2.00%	200	PVC	11.61	1.48	0.013	0.13	46.364	14%
	160C7	D9A8	0	0	0.0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		15.640					150	PVC	245.93		0.013		LS CAPACITY GOOD	
	D9A8	D9A7	12	12	31.2	0.20944	1.000	0.675	0.885		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.885	740.189	738.074	2.48%	200	PVC	85.31	1.64	0.013	0.86	51.643	2%
	D9A7	D9AA	5	37	96.2	0.64579	1.000	2.082	2.728		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.728	738.024	737.323	0.72%	200	PVC	97.47	0.89	0.013	1.83	27.815	10%
	D9AA	EAFA	6	60	156.0	1.04722	1.000	3.376	4.424		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.424	736.123	735.782	0.61%	200	PVC	56.22	0.81	0.013	1.15	25.544	17%
	D9AC	D9AB	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	736.720	736.441	0.37%	200	PVC	76.12	0.63	0.013	2.01	19.857	3%
	D9AB	D9AA	8	17	44.2	0.29671	1.000	0.957	1.253		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.253	736.401	736.153	0.33%	200	PVC	76.29	0.60	0.013	2.14	18.700	7%
	D9A5	D9A6	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	740.437	739.267	0.86%	200	PVC	135.49	0.97	0.013	2.33	30.478	2%
	D9A6	D9A7	11	20	52.0	0.34907	1.000	1.125	1.475		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.475	739.247	738.064	1.04%	200	PVC	114.28	1.06	0.013	1.79	33.370	4%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL			
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha	
Population:	5600										
Residential I/I (l/s/ha)	0.6										
Current Residential Area (ha)	202										

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	28.05494	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE		
PVC	0.013	
VCT	0.015	

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRALIC CAPACITY**
																																new data										
																																invert issue										
IST SE TO SOUTH	D9EA	D974	4	179	465.4	3.12421	1.000	10.073	**13.197**	0.39	6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**24.354**	746.510	746.117	0.33%	250	VCT	118.66	0.60	0.015	3.27	**29.660**	82%
	D974	D977	13	192	499.2	3.35111	1.000	10.804	**14.155**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**25.312**	746.107	745.735	0.33%	250	VCT	111.59	0.61	0.015	3.07	**29.757**	85%
	D977	D978	13	205	533.0	3.57801	1.000	11.536	**15.114**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**26.271**	745.725	745.429	0.26%	250	VCT	115.55	0.53	0.015	3.62	**26.085**	101%
	D978	D968	12	217	564.2	3.78745	1.000	12.211	**15.998**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**27.156**	745.409	745.092	0.28%	250	VCT	113.67	0.55	0.015	3.42	**27.217**	100%
	D968	D967	13	230	598.0	4.01435	1.000	12.942	**16.957**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**28.114**	745.092	744.568	0.46%	250	VCT	115.12	0.71	0.015	2.71	**34.771**	81%
	D967	D97A	14	244	634.4	4.2587	1.000	13.730	**17.989**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**29.146**	744.518	742.589	1.69%	250	VCT	114.31	1.36	0.015	1.40	**66.951**	44%
	D97A	D979	12	256	665.6	4.46815	1.000	14.405	**18.874**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**30.031**	742.579	740.971	1.40%	250	VCT	115.09	1.24	0.015	1.55	**60.919**	49%
	D979	D8DA	11	267	694.2	4.66014	1.000	15.024	**19.685**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**30.842**	740.991	739.662	1.15%	250	VCT	115.08	1.13	0.015	1.70	**55.385**	56%
	D8DA	D8E1	10	277	720.2	4.83468	1.000	15.587	**20.422**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**31.579**	739.672	738.594	1.06%	250	VCT	101.93	1.08	0.015	1.57	**53.002**	60%
	D8E1	D8E0	10	287	746.2	5.00921	1.000	16.150	**21.159**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**32.316**	738.594	737.930	0.63%	250	VCT	104.68	0.84	0.015	2.09	**41.047**	79%
	D8E0	D8DF	17	304	790.4	5.30593	1.000	17.107	**22.412**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**33.570**	737.930	737.648	0.24%	300	VCT	119.77	0.58	0.015	3.47	**40.666**	83%
	D8DF	D8C4	10	314	816.4	5.48046	1.000	17.669	**23.150**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**34.307**	737.638	737.517	0.12%	300	VCT	103.63	0.41	0.015	4.26	**28.637**	120%
	D8C4	D8BB	10	324	842.4	5.655	1.000	18.232	**23.887**		6.16	2.2176	1.000	0.370	**2.587**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		**8.570**	**35.044**	737.507	737.180	0.37%	300	VCT	88.43	0.72	0.015	2.04	**50.963**	69%
BROADWAY TO WEST	398BA	398B7	4	4	10.4	0.06981	1.000	0.225	**0.295**	3.23	3.23	1.1628	1.000	0.194	**1.357**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.652**	749.080	748.890	0.33%	200	PVC	58.32	0.60	0.013	1.63	**18.721**	9%
	398B7	398B5	6	10	26.0	0.17454	1.000	0.563	**0.737**	0.39	3.62	1.3032	1.000	0.217	**1.520**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.258**	748.890	748.470	0.40%	200	PVC	105.47	0.66	0.013	2.67	**20.697**	11%
	398B5	398B3	10	75	195.0	1.30903	1.000	4.220	**5.529**		3.62	1.3032	1.000	0.217	**1.520**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**7.050**	748.470	748.230	0.23%	200	PVC	105.58	0.50	0.013	3.54	**15.638**	45%
	398B3	398B1	10	117	304.2	2.04208	1.000	6.584	**8.626**		3.62	1.3032	1.000	0.217	**1.520**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**10.146**	748.230	747.580	0.62%	200	PVC	105.23	0.82	0.013	2.14	**25.777**	39%
	398B1	D9EE	0	146	379.6	2.54824	1.000	8.216	**10.764**	0.68	4.3	1.548	1.000	0.258	**1.806**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**12.570**	747.580	747.080	0.47%	200	VCT	105.5	0.62	0.015	2.82	**19.569**	64%
	D9EE	D9EF	0	159	413.4	2.77514	1.000	8.947	**11.722**	0.71	5.43	1.9548	1.000	0.326	**2.281**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**14.003**	747.020	746.810	0.20%	200	VCT	105.09	0.40	0.015	4.33	**12.707**	110%
	D9EF	D9EA	0	168	436.8	2.93222	1.000	9.454	**12.386**	0	5.77	2.0772	1.000	0.346	**2.423**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**14.809**	746.830	746.460	0.35%	200	VCT	104.73	0.54	0.015	3.25	**16.895**	88%
2 ST SE TO NORTH	D935	D934	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	748.774	748.275	0.45%	200	VCT	110.29	0.61	0.015	3.02	**19.120**	2%
	D934	D933	3	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	748.275	748.036	0.36%	200	VCT	66.14	0.54	0.015	2.03	**17.087**	4%
	D933	D9EF	0	9	23.4	0.15708	1.000	0.506	**0.664**		0.34	0.1224	1.000	0.020	**0.143**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.806**	748.036	746.990	2.01%	200	VCT	52.01	1.28	0.015	0.68	**40.311**	2%
	EC4F	D933	0	0	0.0	0	1.000	0.000	**0.000**	0.34	0.34	0.1224	1.000	0.020	**0.143**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.143**	748.760	748.076	1.04%	200	VCT	65.68	0.92	0.015	1.19	**29.008**	0%
3 ST SE TO N	D930	D931	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	749.933	749.522	0.39%	200	VCT	106.45	0.56	0.015	3.16	**17.663**	3%
	D931	D932	6	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	749.382	748.756	0.46%	200	VCT	137.23	0.61	0.015	3.74	**19.199**	5%
	D932	D9EE	0	13	33.8	0.2269	1.000	0.732	**0.958**	0.42	0.42	0.1512	1.000	0.025	**0.176**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.135**	748.746	747.310	1.22%	200	VCT	117.76	1.00	0.015	1.96	**31.389**	4%
4 ST TO N	D90D	D90E	12	12	31.2	0.20944	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	751.736	751.051	0.60%	200	VCT	113.38	0.70	0.015	2.69	**22.094**	4%
	D90E	DA7A	11	23	59.8	0.40144	1.000	1.294	**1.696**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.696**	751.051	748.423	2.33%	200	VCT	112.94	1.38	0.015	1.36	**43.360**	4%
	DA7A	DA79	6	29	75.4	0.50616	1.000	1.632	**2.138**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.138**	748.413	748.256	0.24%	200	VCT	66.48	0.44	0.015	2.52	**13.814**	15%
	DA79	398B1	0	29	75.4	0.50616	1.000	1.632	**2.138**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.138**	748.256	747.580	1.31%	200	VCT	51.8	1.03	0.015	0.84	**32.472**	7%
	EC48	EC4C	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	749.150	748.440	1.53%	200	VCT	46.34	1.12	0.015	0.69	**35.185**	0%
	EC4C	DA79	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	748.400	748.276	0.24%	200	VCT	52.25	0.44	0.015	1.98	**13.848**	0%
5 ST TO N	D928	D929	7	7	18.2	0.12218	1.000	0.394	**0.516**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.516**	753.550	752.569	1.13%	200	VCT	86.82	0.96	0.015	1.50	**30.216**	2%
	D929	D92A	8	15	39.0	0.26181	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.106**	752.569	751.841	0.85%	200	VCT	85.82	0.83	0.015	1.72	**26.180**	4%
	D92A	D92B	11	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	751.841	750.141	1.52%	200	VCT	112	1.11	0.015	1.67	**35.020**	5%
	D92B	398B3	6	32	83.2	0.55852	1.000	1.801	**2.359**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.359**	750.141	748.230	1.62%	200	VCT	118.28	1.15	0.015	1.71	**36.131**	7%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	28.05494	l/s
Redcliff Way LS	15.64	l/s

Existing Duty Point (Measured from Drawdown Tests)

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRALIC CAPACITY
																																new data									
																																invert issue									
6 ST TO N	D922	D923	6	6	15.6	0.10472	1.000	0.338	0.442		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.442	755.487	754.894	0.53%	200	VCT	111	0.66	0.015	2.80	20.776	2%
	D923	D924	9	15	39.0	0.26181	1.000	0.844	1.106		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.106	754.894	753.231	1.44%	200	VCT	115.32	1.09	0.015	1.77	34.135	3%
	D924	D925	8	33	85.8	0.57597	1.000	1.857	2.433		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.433	753.231	750.508	2.46%	200	VCT	110.49	1.42	0.015	1.30	44.624	5%
	D925	D926	0	33	85.8	0.57597	1.000	1.857	2.433		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.433	750.508	750.226	3.11%	200	VCT	9.07	1.60	0.015	0.09	50.122	5%
	D926	398B5	3	55	143.0	0.95995	1.000	3.095	4.055		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.055	750.226	748.470	1.60%	200	VCT	109.93	1.14	0.015	1.60	35.926	11%
	D993	D994	8	8	20.8	0.13963	1.000	0.450	0.590		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.590	756.208	755.626	0.73%	200	VCT	79.59	0.77	0.015	1.71	24.307	2%
	D994	D995	2	10	26.0	0.17454	1.000	0.563	0.737		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.737	755.626	754.329	2.18%	200	VCT	59.42	1.34	0.015	0.74	41.996	2%
	D995	D924	0	10	26.0	0.17454	1.000	0.563	0.737		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.737	754.329	753.231	2.01%	200	VCT	54.6	1.28	0.015	0.71	40.310	2%
	D997	D996	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	752.785	752.127	0.84%	200	VCT	78.15	0.83	0.015	1.57	26.083	3%
	D996	D998	5	14	36.4	0.24435	1.000	0.788	1.032		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.032	752.127	750.679	1.95%	200	VCT	74.16	1.26	0.015	0.98	39.720	3%
	D91F	D91E	3	3	7.8	0.05236	1.000	0.169	0.221		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.221	751.316	750.956	0.79%	200	VCT	45.65	0.80	0.015	0.95	25.243	1%
	D91E	D998	2	5	13.0	0.08727	1.000	0.281	0.369		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.369	750.956	750.679	0.70%	200	VCT	39.59	0.76	0.015	0.87	23.777	2%
	D998	D926	0	19	49.4	0.33162	1.000	1.069	1.401		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.401	750.679	750.226	0.83%	200	VCT	54.41	0.83	0.015	1.10	25.937	5%
	Future	D8BB																											45.357												
9 AVE SE TO EAST	D8BB	D8B9	0	545.00	1417.0	9.51227	1.000	30.668	40.180		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	149.199	737.020	736.835	0.18%	450	VCT	104.56	0.65	0.015	2.67	103.935	144%
	D8B9	D8CE	0	894.00	2324.4	15.6036	1.000	50.307	65.910		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	174.929	736.835	736.600	0.24%	450	VCT	99.32	0.76	0.015	2.19	120.192	146%
	D8CE	D8CF	0	949.00	2467.4	16.5636	1.000	53.402	69.965		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	178.984	736.600	736.587	0.21%	450	VCT	6.06	0.72	0.015	0.14	114.444	156%
	D8CF	D8B8	0	970.00	2522.0	16.9301	1.000	54.583	71.513		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	180.532	736.567	736.400	0.16%	450	VCT	105.4	0.62	0.015	2.84	98.355	184%
	D8B8	D8A0	0	1047.00	2722.2	18.274	1.000	58.916	77.190		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	186.209	736.400	736.110	0.27%	450	VCT	106.56	0.81	0.015	2.19	128.902	144%
	D8A0	D8A3	0	1095.00	2847.0	19.1118	1.000	61.617	80.729		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	189.748	736.110	735.940	0.16%	450	VCT	104.31	0.63	0.015	2.77	99.752	190%
	D8A3	D89F	0	1272.00	3307.2	22.2011	1.000	71.577	93.778		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	202.797	735.920	735.490	0.40%	450	VCT	106.69	0.99	0.015	1.80	156.867	129%
	D89F	D89E	0	1383.00	3595.8	24.1385	1.000	77.823	101.962		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	210.981	735.490	735.390	0.18%	450	VCT	56.66	0.65	0.015	1.45	103.806	203%
	D89E	D91C	0	1389.00	3611.4	24.2432	1.000	78.161	102.404		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	211.423	734.520	734.285	0.20%	450	VCT	115.14	0.70	0.015	2.73	111.630	189%
	D91C	D91D	5	1394.00	3624.4	24.3305	1.000	78.442	102.773		6.73	2.4228	1.000	0.404	2.827		0.00	0	1.000	0.000	0.000		0.00	0	1.000	0.000	0.000	45.357	60.835	211.792	734.275	733.951	0.28%	450	VCT	114.57	0.83	0.015	2.31	131.400	161%
	D91D	DA0E	13	1500	3900.0	26.1806	1.000	84.407	110.588		6.73	2.4228	1.000	0.404	2.827		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000	45.357	60.835	219.607	733.941	733.598	0.30%	450	VCT	114.52	0.85	0.015	2.24	135.228	162%
2 ST TO SOUTH	D935	D99C	7	7	18.2	0.12218	1.000	0.394	0.516		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.516	748.754	748.290	0.40%	200	VCT	116.37	0.57	0.015	3.39	17.949	3%
	D99C	D936	9	16	41.6	0.27926	1.000	0.900	1.180		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.180	748.280	747.198	0.94%	200	VCT	115.27	0.88	0.015	2.19	27.540	4%
	D936	D937	14	30	78.0	0.52361	1.000	1.688	2.212		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.212	747.188	745.505	1.46%	200	VCT	115.27	1.09	0.015	1.76	34.347	6%
	D937	DA7B	5	35	91.0	0.61088	1.000	1.970	2.580		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.580	745.495	743.703	3.32%	200	VCT	54.01	1.65	0.015	0.55	51.777	5%
	DA7B	D97B	9	44	114.4	0.76796	1.000	2.476	3.244		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			3.244	743.668	743.598	0.11%	200	VCT	61.61	0.30	0.015	3.37	9.581	34%
	D97B	D975	12	56	145.6	0.97741	1.000	3.151	4.129		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.129	743.558	741.343	1.93%	200	VCT	114.61	1.26	0.015	1.52	39.517	10%
	D975	D8D9	14	70	182.0	1.22176	1.000	3.939	5.161		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			5.161	741.333	740.077	1.09%	200	VCT	114.88	0.95	0.015	2.02	29.722	17%
	D8D9	D8E7	10	290	754.0	5.06157	1.000	16.319	21.380		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			21.380	740.087	738.656	1.37%	250	VCT	104.11	1.23	0.015	1.41	60.423	35%
	D8E7	D8E6	6	296	769.6	5.1663	1.000	16.656	21.823		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			21.823	738.656	738.039	0.59%	250	VCT	104.18	0.81	0.015	2.15	39.663	55%
	D8E6	D8E5	14	310	806.0	5.41065	1.000	17.444	22.855		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			22.855	738.039	737.825	0.22%	250	VCT	98.51	0.49	0.015	3.36	24.021	95%
	D8E5	D8C5	8	318	826.8	5.55028	1.000	17.894	23.445		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			23.445	737.825	737.460	0.36%	250	VCT	101.82	0.63	0.015	2.70	30.858	76%
	D8C5	D8B9	14	332	863.2	5.79463	1.000	18.682	24.477		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			24.477	737.460	736.835	0.58%	200	VCT	108.05	0.69	0.015	2.62	21.619	113%
3 ST TO SOUTH	D930	D92F	4	4	10.4	0.06981	1.000	0.225	0.295		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.295	750.163	749.473	0.65%	200	VCT	106.26	0.73	0.015	2.43	22.906	1%
	D92F	D92E	5	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	749.453	747.61	1.72%	200	VCT	106.86	1.19	0.015	1.50	37.330	2%
	D92E	15611	14	54	140.4	0.9425	1.000	3.039	3.981		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			3.981	747.580	744.3	2.78%	200	VCT	117.92	1.51	0.015	1.30	47.408	8%
	15611	D976	8	62	161.2	1.08213	1.000	3.489	4.571		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			4.571	744.320	742.355	1.71%	200	VCT	115.06	1.18	0.015	1.62	37.147	12%
	D976	D8D8	16	78	202.8	1.36139	1.000	4.389	5.751		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			5.751	742.305	740.686	1.43%	200	VCT	113.15	1.08	0.015	1.74	34.002	17%
	FLOWS WEST ALONG 6 AVE																																								
	D8D8	D8E8	9	9	23.4	0.15708	1.000	0.506	0.664		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			0.664	740.706	739.621	1.33%	200	VCT	81.33	1.05	0.015	1.30	32.832	2%
	D8E8	D8E2	6	15	39.0	0.26181	1.000	0.844	1.106		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.106	739.621	738.781	1.01%	200	VCT	83.32	0.91	0.015	1.53	28.541	4%
	D8E2	D8E3	6	21	54.6	0.36653	1.000	1.182	1.548		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			1.548	738.781	738.617	0.29%	200	VCT	57.36	0.48	0.015	1.98	15.199	10%
	D8E3	D8E4	13	34	88.4	0.59343	1.000	1.913	2.507		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000		0	0	1.000	0.000	0.000			2.507	738.587	737.951	0.57%	200	VCT	112	0.68	0.015	2.74	21.420	12%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL					
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha			
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha			
Population:	5600												
Residential I/I (l/s/ha)	0.6												
Current Residential Area (ha)	202												

Existing Duty Point (Measured from Drawdown Tests)	
Factory LS Flow 1 (50%)	17.14 l/s
Factory LS Flow 2 (50%)	
Jesmond LS	28.05494 l/s
Redcliff Way LS	15.64 l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																																new data										
																																invert issue										
	D8E4	D99F	10	44	114.4	0.76796	1.000	2.476	**3.244**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.244**	737.951	737.505	0.40%	200	VCT	110.49	0.57	0.015	3.20	**18.060**	18%
	D99F	D8CE	11	55	143.0	0.95995	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.055**	737.485	736.86	0.56%	200	VCT	111.04	0.68	0.015	2.73	**21.326**	19%
4TH AVE TO WEST	D921	D99E	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	754.091	751.821	2.15%	200	VCT	105.58	1.33	0.015	1.33	**41.680**	0%
	D99E	D92C	0	17	44.2	0.29671	1.000	0.957	**1.253**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.253**	751.811	749.714	1.98%	200	VCT	105.7	1.27	0.015	1.38	**40.038**	3%
	D92C	D92E	0	31	80.6	0.54106	1.000	1.744	**2.285**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.285**	749.714	747.750	1.87%	200	VCT	105.12	1.24	0.015	1.42	**38.854**	6%
	D928	D927	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	753.550	752.663	1.02%	200	VCT	86.54	0.92	0.015	1.57	**28.778**	2%
	D927	D99E	9	17	44.2	0.29671	1.000	0.957	**1.253**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.253**	752.663	751.911	0.88%	200	VCT	85.89	0.85	0.015	1.69	**26.598**	5%
	D90D	D92D	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	751.736	751.206	0.46%	200	VCT	115.5	0.61	0.015	3.14	**19.255**	3%
	D92D	D92C	6	14	36.4	0.24435	1.000	0.788	**1.032**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.032**	751.206	749.714	1.30%	200	VCT	114.69	1.03	0.015	1.85	**32.421**	3%
	D922	D921	10	10	26.0	0.17454	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	755.507	754.221	1.08%	200	VCT	119.25	0.94	0.015	2.12	**29.519**	2%
	D952	D920	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	756.938	755.476	1.37%	200	VCT	106.41	1.06	0.015	1.67	**33.319**	1%
	D920	D921	0	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	755.466	754.101	1.29%	200	VCT	105.52	1.03	0.015	1.71	**32.330**	1%
6 AVE SE TO WEST	D8D5	D8D6	5	55	143.0	0.95995	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.055**	744.086	743.146	0.89%	200	VCT	105.52	0.85	0.015	2.06	**26.829**	15%
	D8D6	D8D7	6	98	254.8	1.71046	1.000	5.515	**7.225**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**7.225**	743.166	741.570	1.51%	200	VCT	105.78	1.11	0.015	1.59	**34.916**	21%
	D8D7	D8D8	0	132	343.2	2.30389	1.000	7.428	**9.732**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**9.732**	741.560	740.676	0.84%	200	VCT	104.93	0.83	0.015	2.11	**26.090**	37%
	D8D8	D8D9	0	210	546.0	3.66528	1.000	11.817	**15.482**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**15.482**	740.646	740.277	0.35%	200	VCT	105.35	0.54	0.015	3.28	**16.818**	92%
4 ST	D92C	D97C	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	749.714	747.410	2.65%	200	VCT	86.78	1.47	0.015	0.98	**46.317**	1%
	D97C	D96C	8	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	747.410	745.389	2.34%	200	VCT	86.25	1.38	0.015	1.04	**43.512**	3%
	D96C	D97D	9	25	65.0	0.43634	1.000	1.407	**1.843**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.843**	745.389	742.525	3.29%	200	VCT	87.12	1.64	0.015	0.89	**51.539**	4%
	D97D	D8D7	9	34	88.4	0.59343	1.000	1.913	**2.507**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.507**	745.525	741.580	4.60%	200	VCT	85.76	1.94	0.015	0.74	**60.966**	4%
5 ST	D99E	D97F	14	14	36.4	0.24435	1.000	0.788	**1.032**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.032**	751.911	749.408	2.20%	200	VCT	113.53	1.34	0.015	1.41	**42.207**	2%
	D97F	D97E	10	24	62.4	0.41889	1.000	1.351	**1.769**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.769**	749.408	745.903	3.03%	200	VCT	115.85	1.57	0.015	1.23	**49.443**	4%
	D97E	D8D6	13	37	96.2	0.64579	1.000	2.082	**2.728**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.728**	745.903	743.146	2.38%	200	VCT	115.83	1.40	0.015	1.38	**43.854**	6%
6 ST	D921	D980	12	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	754.431	750.596	3.15%	200	VCT	121.77	1.61	0.015	1.26	**50.445**	4%
	D980	D981	12	38	98.8	0.66324	1.000	2.138	**2.802**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.802**	750.596	746.972	2.97%	200	VCT	122	1.56	0.015	1.30	**48.991**	6%
	D981	D8D5	12	50	130.0	0.87269	1.000	2.814	**3.686**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.686**	746.972	743.786	3.12%	200	VCT	102.18	1.60	0.015	1.07	**50.193**	7%
7 AVE TO EAST	D8D7	FC60	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	741.570	740.300	1.24%	200	VCT	102.35	1.01	0.015	1.69	**31.664**	1%
	FC60	FC61	0	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	740.260	740.130	1.57%	200	PVC	8.29	1.31	0.013	0.11	**41.072**	1%
	FC61	17DCC	8	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	740.080	738.615	1.40%	200	PVC	105	1.23	0.013	1.42	**38.742**	2%
	17DCC	D8F6	7	20	52.0	0.34907	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	739.460	738.615	0.83%	200	PVC	101.98	0.95	0.013	1.79	**29.855**	5%
	FC60	FC5C	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	740.270	740.132	0.12%	200	VCT	111.56	0.32	0.015	5.84	**9.997**	4%
	FC5C	D8F6	5	11	28.6	0.19199	1.000	0.619	**0.811**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.811**	740.132	738.615	1.60%	250	VCT	94.74	1.33	0.015	1.19	**65.217**	1%
6 ST TO TRUNK	D8D5	D8F6	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	743.666	738.615	4.66%	200	VCT	108.44	1.95	0.015	0.93	**61.348**	1%
	D8F6	D8F7	11	48	124.8	0.83778	1.000	2.701	**3.539**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.539**	738.615	737.999	0.53%	200	VCT	115.92	0.66	0.015	2.93	**20.721**	17%
	D8F7	D8CB	14	62	161.2	1.08213	1.000	3.489	**4.571**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.571**	737.999	737.231	0.64%	200	PVC	119.68	0.84	0.013	2.39	**26.274**	17%
	D8CB	D8D2	9	71	184.6	1.23921	1.000	3.995	**5.234**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.234**	737.101	736.750	0.41%	200	VCT	85.4	0.58	0.015	2.45	**18.223**	29%
	D8D2	D8A3	9	80	208.0	1.3963	1.000	4.502	**5.898**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.898**	736.750	735.708	1.19%	200	VCT	87.28	0.99	0.015	1.47	**31.059**	19%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL			Existing Duty Point (Measured from Drawdown Tests)		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	17.14	l/s	Factory LS Flow 1 (50%)
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha			Factory LS Flow 2 (50%)
Population:	5600										28.05494	l/s	Jesmond LS
Residential I/I (l/s/ha)	0.6										15.64	l/s	Redcliff Way LS
Current Residential Area (ha)	202												

MANNINGS "n" VALUE: PVC 0.013; VCT 0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																																new data										
																																invert issue										
5 ST TO TRUNK	D8CB	D8CA	Pipe shown on drawing but does not exist																																							
	D8CA	D8D1	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	737.436	737.098	0.43%	200	VCT	78.66	0.59	0.015	2.21	**18.633**	4%
	D8D1	D8A0	9	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	737.098	736.110	1.05%	200	VCT	93.73	0.93	0.015	1.68	**29.184**	5%
4 ST TO TRUNK	D8CA	D8C9	Pipe shown on drawing but does not exist																																							
	D8C9	D8D0	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	738.462	737.860	0.70%	200	VCT	86.21	0.76	0.015	1.90	**23.753**	3%
	D8D0	D8B8	9	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	737.850	736.400	1.68%	200	VCT	86.16	1.17	0.015	1.22	**36.875**	4%
7 ST TO TRUNK MAIN	D920	D96D	10	10	26.0	0.17454	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	755.486	751.275	3.47%	200	VCT	121.4	1.69	0.015	1.20	**52.941**	1%
	D96D	D982	12	22	57.2	0.38398	1.000	1.238	**1.622**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.622**	751.245	747.390	3.16%	200	VCT	122.08	1.61	0.015	1.27	**50.512**	3%
	D982	D8D4	10	32	83.2	0.55852	1.000	1.801	**2.359**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.359**	747.390	744.518	2.78%	200	VCT	103.25	1.51	0.015	1.14	**47.408**	5%
	D8D4	D8F5	10	42	109.2	0.73306	1.000	2.363	**3.096**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.096**	744.518	741.310	2.69%	200	VCT	119.36	1.48	0.015	1.34	**46.601**	7%
	D8F5	D8F4	10	52	135.2	0.90759	1.000	2.926	**3.834**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.834**	741.310	739.509	2.24%	200	VCT	80.3	1.36	0.015	0.99	**42.570**	9%
	D8F4	D8E9	17	69	179.4	1.20431	1.000	3.883	**5.087**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.087**	739.509	737.612	1.74%	200	VCT	108.88	1.19	0.015	1.52	**37.520**	14%
	D8E9	D8D3	14	83	215.8	1.44866	1.000	4.671	**6.119**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.119**	737.612	736.431	1.16%	200	VCT	101.89	0.97	0.015	1.74	**30.603**	20%
	D8D3	D89F	10	93	241.8	1.62319	1.000	5.233	**6.856**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.856**	736.401	735.490	0.85%	200	VCT	106.84	0.84	0.015	2.13	**26.248**	26%
	D8A1	D89F	18	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	736.31	735.49	0.72%	200	VCT	113.86	0.77	0.015	2.47	**24.123**	6%
MITCHELL ST	D991	D992	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	MH not found			200	VCT	42.54	0.00	0.015	#DIV/0!	**0.000**	
	D992	D8CC	0	0	0.0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	738.193	737.210	1.36%	200	VCT	72.3	1.05	0.015	1.14	**33.145**	0%
	D8CC	D8CD	3	3	7.8	0.05236	1.000	0.169	**0.221**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.221**	737.190	736.310	1.02%	200	VCT	86.04	0.92	0.015	1.57	**28.747**	1%
	D8CD	D89E	3	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	736.300	734.680	1.87%	200	VCT	86.82	1.24	0.015	1.17	**38.829**	1%
1ST NOR	D8C2	D8C3	10	10	26.0	0.17454	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	738.392	738.100	0.38%	200	VCT	76.03	0.56	0.015	2.26	**17.616**	4%
	D8C3	D8BB	9	19	49.4	0.33162	1.000	1.069	**1.401**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.401**	738.100	737.160	1.23%	200	VCT	76.2	1.00	0.015	1.26	**31.571**	4%
2 ST NOR	D8C7	D8C6	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	739.349	738.762	0.77%	200	VCT	76.07	0.79	0.015	1.60	**24.970**	2%
	D8C6	D8B9	9	17	44.2	0.29671	1.000	0.957	**1.253**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.253**	738.762	736.835	2.54%	200	VCT	75.96	1.44	0.015	0.88	**45.274**	3%
3 ST NOR	D8B5	D8C8	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	738.980	737.253	2.20%	200	PVC	78.41	1.55	0.013	0.84	**48.676**	1%
	D8C8	D8CF	12	21	54.6	0.36653	1.000	1.182	**1.548**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.548**	737.253	736.787	0.50%	200	VCT	94.04	0.64	0.015	2.46	**20.010**	8%
RIVERVIEW	1B814	D8AA	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	742.122	741.199	1.10%	200	PVC	84.09	1.09	0.013	1.28	**34.362**	2%
	D8AA	D8AB	5	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	741.199	740.482	1.64%	200	PVC	43.63	1.34	0.013	0.54	**42.046**	2%
	1B814	D8A9	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	742.122	741.636	1.10%	200	PVC	44.01	1.10	0.013	0.67	**34.466**	1%
	D8A9	D8AB	5	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	741.636	740.482	1.39%	200	PVC	83.32	1.23	0.013	1.13	**38.599**	2%
	D8AB	D8A8	5	27	70.2	0.47125	1.000	1.519	**1.991**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.991**	740.482	738.760	2.32%	200	PVC	74.34	1.59	0.013	0.78	**49.918**	4%
	D8AF	D8AE	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	739.846	739.161	1.07%	200	PVC	63.76	1.08	0.013	0.98	**33.996**	1%
	D8AC	D8F7	9	9	23.4	0.15708	1.000	0.506	**0.664**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.664**	739.849	739.714	0.54%	200	PVC	25.08	0.77	0.013	0.55	**24.063**	3%
	D8F7	D8AE	7	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	739.714	739.161	0.56%	200	PVC	99.61	0.78	0.013	2.13	**24.438**	5%
	D8AE	D8A8	5	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	739.161	738.760	0.47%	200	PVC	84.86	0.72	0.013	1.97	**22.546**	9%
	D8A8	DEA7	5	58	150.8	1.01231	1.000	3.264	**4.276**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.276**	738.760	738.560	0.45%	200	PVC	44.93	0.70	0.013	1.08	**21.883**	20%
	DEA7	EC33	19	77	200.2	1.34394	1.000	4.333	**5.677**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**5.677**	738.560	737.810	0.44%	200	PVC	170.2	0.69	0.013	4.09	**21.772**	26%
	EC33	D8A2	10	87	226.2	1.51847	1.000	4.896	**6.414**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.414**	737.810	736.780	1.31%	200	VCT	78.82	1.03	0.015	1.27	**32.494**	20%
	D8A2	D8A3	10	97	252.2	1.69301	1.000	5.458	**7.151**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**7.151**	736.780	736.130	0.70%	200	VCT	93.33	0.76	0.015	2.06	**23.722**	30%
	D8AF	D8B0	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	739.846	739.493	0.55%	200	PVC	64.76	0.77	0.013	1.40	**24.215**	2%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

SOUTH TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured from Drawdown Tests)		
Factory LS Flow 1 (50%)	17.14	l/s
Factory LS Flow 2 (50%)		
Jesmond LS	28.05494	l/s
Redcliff Way LS	15.64	l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE (SEE TAB)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRALIC CAPACITY
																																new data									
																																invert issue									
	D8B0	D8B1	5	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	739.493	739.125	0.59%	200	PVC	62.51	0.80	0.013	1.30	**25.165**	4%
	D8B2	D8B1	13	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	740.677	739.125	1.81%	200	PVC	85.92	1.40	0.013	1.02	**44.081**	2%
	D8B1	D8B3	2	28	72.8	0.4887	1.000	1.576	**2.064**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.064**	739.125	738.430	0.77%	200	PVC	90.71	0.91	0.013	1.65	**28.709**	7%
	D8B6	D8B5	8	8	20.8	0.13963	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	739.640	738.980	0.50%	200	PVC	133.19	0.73	0.013	3.02	**23.088**	3%
	D8B5	D8B3	5	13	33.8	0.2269	1.000	0.732	**0.958**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.958**	738.980	738.430	0.52%	200	PVC	105.27	0.75	0.013	2.33	**23.707**	4%
	D8B3	D8B7	10	51	132.6	0.89014	1.000	2.870	**3.760**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**3.760**	738.430	737.680	0.87%	200	VCT	86.49	0.84	0.015	1.71	**26.470**	14%
	D8B7	D8B8	8	59	153.4	1.02977	1.000	3.320	**4.350**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.350**	737.680	736.400	1.48%	200	VCT	86.31	1.10	0.015	1.31	**34.616**	13%
EASTSIDE PHASE 1	6BC77	6BC71	16	16	41.6	0.27926	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	735.760	735.341	0.62%	200	PVC	68.02	0.82	0.013	1.38	**25.742**	5%
	6BC71	BBC72	16	55	143.0	0.95995	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**4.055**	735.311	734.650	0.90%	200	PVC	73.26	0.99	0.013	1.23	**31.154**	13%
	BBC72	6BC74	12	93	241.8	1.62319	1.000	5.233	**6.856**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**6.856**	734.620	734.033	0.60%	200	PVC	97.2	0.81	0.013	2.00	**25.488**	27%
	6BC6F	6BC70	18	18	46.8	0.31417	1.000	1.013	**1.327**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.327**	736.887	736.540	0.40%	200	PVC	86.78	0.66	0.013	2.19	**20.740**	6%
	6BC70	6BC71	5	23	59.8	0.40144	1.000	1.294	**1.696**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.696**	736.540	736.046	0.52%	200	PVC	94.5	0.75	0.013	2.09	**23.714**	7%
	6BC75	6BC73	5	5	13.0	0.08727	1.000	0.281	**0.369**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.369**	735.498	735.277	0.60%	200	PVC	36.75	0.81	0.013	0.76	**25.434**	1%
	6BC73	6BC72	6	26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.917**	735.247	734.680	0.60%	200	PVC	94.5	0.81	0.013	1.95	**25.406**	8%
	6BC76	6BC73	15	15	39.0	0.26181	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.106**	736.086	735.307	0.80%	200	PVC	97	0.94	0.013	1.73	**29.392**	4%
5 ST TO NORTH	D8B4	D8A5	6	6	15.6	0.10472	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.442**	738.380	738.040	0.41%	200	PVC	83.7	0.67	0.013	2.10	**20.904**	2%
	D8A6	D8A5	4	4	10.4	0.06981	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.295**	738.280	738.040	0.50%	200	PVC	48.43	0.73	0.013	1.10	**23.089**	1%
	D8A5	D8A4	10	20	52.0	0.34907	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	738.040	737.430	0.77%	200	VCT	79.1	0.79	0.015	1.66	**24.962**	6%
	D8A4	D8A0	10	30	78.0	0.52361	1.000	1.688	**2.212**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**2.212**	737.430	736.110	1.42%	200	VCT	93.22	1.08	0.015	1.44	**33.825**	7%
TRUNK MAIN	DA0E	DA0D	4	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**45.357**	60.835	**219.902**	733.568	733.208	0.29%	450	PVC	122.09	0.97	0.013	2.09	**154.817**	142%
	DA0D	DA0C	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**45.357**	60.835	**219.902**	733.168	732.867	0.30%	450	PVC	100.2	0.98	0.013	1.70	**156.263**	141%
	DA0C	DA0B	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**45.357**	60.835	**219.902**	732.657	731.147	1.26%	450	PVC	119.98	2.01	0.013	0.99	**319.846**	69%
	DA0B	DA0A	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**45.357**	60.835	**219.902**	731.137	729.826	1.09%	375	PVC	120.64	1.65	0.013	1.22	**182.773**	120%
	Future	DA0A																										**20.151**													
	DA0A	DA09	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**65.508**	60.835	**240.052**	729.716	727.367	1.92%	375	VCT	122.31	1.91	0.015	1.07	**210.581**	114%
	DA09	DA08	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**65.508**	60.835	**240.052**	727.347	726.177	0.95%	375	VCT	122.66	1.34	0.015	1.52	**148.406**	162%
	DA08	DA07	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**65.508**	60.835	**240.052**	726.167	725.577	0.48%	375	VCT	122.21	0.96	0.015	2.13	**105.580**	227%
	DA07	DA06	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**65.508**	60.835	**240.052**	725.557	724.960	0.49%	375	VCT	121.55	0.96	0.015	2.10	**106.492**	225%
	DA06	DA05	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**65.508**	60.835	**240.052**	724.860	723.487	1.12%	375	VCT	122.43	1.46	0.015	1.40	**160.916**	149%
	DA05	DA04	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**65.508**	60.835	**240.052**	723.502	722.956	0.45%	375	VCT	121.26	0.92	0.015	2.19	**101.964**	235%
	Future	DA04																										**9.125**													
	DA04	DA03	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**74.633**	60.835	**249.178**	722.946	722.387	0.46%	375	VCT	121.3	0.93	0.015	2.16	**103.154**	242%
	DA03	E86F	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**74.633**	60.835	**249.178**	722.377	722.038	0.78%	375	VCT	43.5	1.21	0.015	0.60	**134.142**	186%
		SUM	1837	4776.2						7.26						4.54						0.00																			
		CHECK	OK							OK						OK						OK																			

86-100%	4
100-150%	19
150-250%	15
>250%	0

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NW TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen	0.4	l/s/ha	Gen	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point 43.88 (measured by Draw down tests)

NW LS 127.7206 l/s

MANNINGS "n" VALUE: PVC 0.013; VCT 0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
8 ST	D9AE	D9B1		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	741.664	740.591	0.93%	200	PVC	114.78	1.01	0.013	1.90	**31.712**	0%
	D9B1	44DF9		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.86	1.86	0.744	1.000	0.372	**1.116**		0	0	1.000	0.000	**0.000**			**1.116**	740.591	740.335	0.40%	200	PVC	63.56	0.66	0.013	1.60	**20.815**	5%
	44DF9	D9B2		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		1.86	0.744	1.000	0.372	**1.116**		0	0	1.000	0.000	**0.000**			**1.116**	740.345	740.029	0.51%	200	PVC	62.56	0.74	0.013	1.41	**23.310**	5%
	Future	D9B2																										**9.839**														
	D9B2	D9B4	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**	0.87	2.73	1.092	1.000	0.546	**1.638**		0	0	1.000	0.000	**0.000**	**9.839**		**12.214**	740.019	739.672	0.42%	200	PVC	82.83	0.68	0.013	2.04	**21.229**	58%
	D9B4	D9B5		10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		4.59	1.836	1.000	0.918	**2.754**		0	0	1.000	0.000	**0.000**	**9.839**		**13.330**	739.692	739.243	0.40%	200	PVC	113.15	0.66	0.013	2.87	**20.661**	65%
	D9B3	D9B4		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.86	1.86	0.744	1.000	0.372	**1.116**		0	0	1.000	0.000	**0.000**			**1.116**	740.005	739.702	0.47%	200	PVC	63.99	0.72	0.013	1.48	**22.569**	5%
6 ST	D9AD	D9AF		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	2.25	2.25	0.9	1.000	0.450	**1.350**		0	0	1.000	0.000	**0.000**			**1.350**	741.223	740.951	0.46%	200	PVC	59.13	0.71	0.013	1.39	**22.245**	6%
	D9AF	D9B0		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		2.25	0.9	1.000	0.450	**1.350**		0	0	1.000	0.000	**0.000**			**1.350**	740.941	740.695	0.47%	200	PVC	52.01	0.72	0.013	1.21	**22.557**	6%
	D9B0	29072		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.49	3.74	1.496	1.000	0.748	**2.244**		0	0	1.000	0.000	**0.000**			**2.244**	740.675	740.070	0.63%	200	PVC	96.13	0.83	0.013	1.93	**26.020**	9%
	29072	D9B5		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		3.74	1.496	1.000	0.748	**2.244**		0	0	1.000	0.000	**0.000**			**2.244**	740.060	739.223	0.59%	200	PVC	141.95	0.80	0.013	2.95	**25.185**	9%
	D9B5	D9B6	5	15	39	0.2618	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		8.33	3.332	1.000	1.666	**4.998**		0	0	1.000	0.000	**0.000**	**9.839**		**15.943**	739.223	739.170	0.06%	200	PVC	89.93	0.25	0.013	5.91	**7.962**	200%
	D9B6	D9B9	5	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**	1.29	9.62	3.848	1.000	1.924	**5.772**		0	0	1.000	0.000	**0.000**	**9.839**		**17.085**	739.070	738.500	0.67%	200	PVC	84.94	0.86	0.013	1.66	**26.868**	64%
	D9B9	EC5E		26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**	1.29	14.59	5.836	1.000	2.918	**8.754**		0	0	1.000	0.000	**0.000**	**9.839**		**20.510**	738.480	738.110	0.43%	200	VCT	86.68	0.59	0.015	2.44	**18.571**	110%
	EC5E	D9C8		26	67.6	0.4538	1.000	1.463	**1.917**		0	0	1.000	0.000	**0.000**		14.59	5.836	1.000	2.918	**8.754**		0	0	1.000	0.000	**0.000**	**9.839**		**20.510**	738.110	737.704	0.47%	200	VCT	85.85	0.62	0.015	2.30	**19.548**	105%
1 AVE	D9B7	D9B8	2	2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**	1.84	1.84	0.736	1.000	0.368	**1.104**		0	0	1.000	0.000	**0.000**			**1.251**	739.346	738.972	0.45%	200	PVC	83.92	0.70	0.013	2.01	**21.896**	6%
	D9B8	D9B9	4	6	15.6	0.1047	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**	1.84	3.68	1.472	1.000	0.736	**2.208**		0	0	1.000	0.000	**0.000**			**2.650**	738.902	738.500	0.35%	200	PVC	113.66	0.62	0.013	3.05	**19.506**	14%
2 AVE	D9C7	D9C6		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	738.448	738.153	0.93%	200	VCT	31.85	0.87	0.015	0.61	**27.357**	0%
	D9C5	D9C6	3	3	7.8	0.0524	1.000	0.169	**0.221**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.221**	738.449	738.153	1.04%	200	PVC	28.46	1.06	0.013	0.45	**33.449**	1%
	D9C6	D9C8		3	7.8	0.0524	1.000	0.169	**0.221**		0	0	1.000	0.000	**0.000**	1.79	1.79	0.716	1.000	0.358	**1.074**		0	0	1.000	0.000	**0.000**			**1.295**	738.133	737.684	0.39%	200	PVC	114.89	0.65	0.013	2.93	**20.504**	6%
	D9C8	D9CB	1	30	78	0.5236	1.000	1.688	**2.212**		0	0	1.000	0.000	**0.000**		16.38	6.552	1.000	3.276	**9.828**		0	0	1.000	0.000	**0.000**	**9.839**		**21.879**	737.654	737.370	0.29%	200	PVC	97.12	0.56	0.013	2.87	**17.736**	123%
5 ST	D9BB	D9BE		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	1.85	1.85	0.74	1.000	0.370	**1.110**		0	0	1.000	0.000	**0.000**			**1.110**	739.915	739.787	0.31%	200	PVC	41.49	0.58	0.013	1.19	**18.217**	6%
	D9BE	D9BF	2	2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**		1.85	0.74	1.000	0.370	**1.110**		0	0	1.000	0.000	**0.000**			**1.257**	739.767	739.462	0%	200	PVC	84.13	0.63	0.013	2.23	**19.748**	6%
	D9BF	D9C0		2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**	0.45	2.3	0.92	1.000	0.460	**1.380**		0	0	1.000	0.000	**0.000**			**1.527**	739.452	739.146	0.37%	200	VCT	83.48	0.55	0.015	2.54	**17.210**	9%
	D9C0	D9C4		2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**		2.3	0.92	1.000	0.460	**1.380**		0	0	1.000	0.000	**0.000**			**1.527**	739.146	738.731	0.47%	200	VCT	87.56	0.62	0.015	2.34	**19.569**	8%
	D9C4	D9CB		2	5.2	0.0349	1.000	0.113	**0.147**		0	0	1.000	0.000	**0.000**		2.3	0.92	1.000	0.460	**1.380**		0	0	1.000	0.000	**0.000**			**1.527**	738.731	737.340	1.60%	200	PVC	86.95	1.32	0.013	1.10	**41.484**	4%
	D9CB	EC5A	5	37	96.2	0.6458	1.000	2.082	**2.728**		0	0	1.000	0.000	**0.000**		18.68	7.472	1.000	3.736	**11.208**		0	0	1.000	0.000	**0.000**	**9.839**		**23.775**	737.340	737.103	0.27%	200	PVC	86.74	0.55	0.013	2.65	**17.144**	139%
	EC5A	D9CC	4	41	106.6	0.7156	1.000	2.307	**3.023**		0	0	1.000	0.000	**0.000**		18.68	7.472	1.000	3.736	**11.208**		0	0	1.000	0.000	**0.000**	**9.839**		**24.070**	737.103	736.864	0.28%	200	PVC	85.32	0.55	0.013	2.57	**17.359**	139%
3 AVE	Future	D9C9																										**43.989**														
	D9C9	D9CA		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	3.02	3.02	1.208	1.000	0.604	**1.812**		0	0	1.000	0.000	**0.000**	**43.989**		**45.801**	736.755	736.252	0.49%	200	PVC	103.11	0.73	0.013	2.36	**22.908**	200%
	D9CA	D9CC		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		3.02	1.208	1.000	0.604	**1.812**		0	0	1.000	0.000	**0.000**	**43.989**		**45.801**	736.252	735.484	0.83%	200	PVC	92.59	0.95	0.013	1.62	**29.871**	153%
	D9CC	D93E		41	106.6	0.7156	1.000	2.307	**3.023**		0	0	1.000	0.000	**0.000**	1.4	23.1	9.24	1.000	4.620	**13.860**		0	0	1.000	0.000	**0.000**	**53.828**		**70.710**	735.494	735.149	0.33%	200	PVC	103.91	0.60	0.013	2.88	**18.899**	374%
BROADWAY	D9C2	D9C1	12	12	31.2	0.2094	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	745.601	745.476	0.42%	250	PVC	29.54	0.79	0.013	0.62	**38.684**	2%
	D9C1	137E6		12	31.2	0.2094	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	745.466	744.135	1.07%	250	PVC	124.13	1.25	0.013	1.65	**61.579**	1%
	137E6	D938		12	31.2	0.2094	1.000	0.675	**0.885**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.885**	744.115	742.629	1.32%	250	PVC	112.36	1.39	0.013	1.34	**68.389**	1%
4 ST	D9BA	2908D	1	1	2.6	0.0175	1.000	0.056	**0.074**		0	0	1.000	0.000	**0.000**	0.97	0.97	0.388	1.000	0.194	**0.582**		0	0	1.000	0.000	**0.000**			**0.656**	741.423	741.415	0.03%	250	PVC	29.87	0.20	0.013	2.51	**9.732**	7%
	2908D	D9BC	3	4	10.4	0.0698	1.000	0.225	**0.295**		0	0	1.000	0.000	**0.000**		0.97	0.388	1.000	0.194	**0.582**		0	0	1.000	0.000	**0.000**			**0.877**	741.415	741.209	0.33%	250	PVC	63.12	0.69	0.013	1.52	**33.973**	3%
	D9BC	D938	2	6	15.6	0.1047	1.000	0.338	**0.442**		0	0	1.000	0.000	**0.000**		0.97	0.388	1.000	0.194	**0.582**		0	0	1.000	0.000	**0.000**			**1.024**	741.189	740.989	0.31%	250	PVC	65.46	0.67	0.013	1.63	**32.871**	3%
	D938	D939	4	22	57.2	0.384	1.000	1.238	**1.622**		0	0	1.000	0.000	**0.000**	0.52	1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**2.516**	740.999	740.674	0.37%	250	PVC	88.78	0.73	0.013	2.02	**35.980**	7%
	D939	DD0C	3	25	65	0.4363	1.000	1.407	**1.843**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**2.737**	740.694	740.477	0.26%	250	PVC	83.76	0.62	0.013	2.26	**30.269**	9%
	DD0C	D93B	10	35	91	0.6109	1.000	1.970	**2.580**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**3.474**	740.437	740.150	0.33%	250	PVC	86.48	0.70	0.013	2.07	**34.258**	10%
	D93B	D93C	10	45	117	0.7854	1.000	2.532	**3.318**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**4.212**	740.180	739.837	0.40%	250	PVC	86.75	0.76	0.013	1.90	**37.393**	11%
	D93C	D93D	10	55	143	0.96	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**4.949**	739.847	739.397	0.52%	250	PVC	86.17	0.88	0.013	1.64	**42.974**	12%
	D93D	D93E	10	65	169	1.1345	1.000	3.658	**4.792**		0	0	1.000	0.000	**0.000**		1.49	0.596	1.000	0.298	**0.894**		0	0	1.000	0.000	**0.000**			**5.686**	738.407	737.099	1.56%	250	PVC	84.05	1.51	0.013	0.93	**74.185**	8%
3 ST	1420D	D942	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	742.016	741.700	0.51%	200	PVC	61.87	0.75	0.013	1.38	**23.440**	3%
	D942	D941	10	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	16.11	16.11	1.6916	1.000	0.322	**2.014**			**3.488**	741.700	741.315	0.41%	200	PVC	92.98	0.67	0.013	2.31	**21.105**	17%
	D941	D940	0	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**3.488**	741.315	740.240	19.13%	200	PVC	5.62	4.57	0.013	0.02	**143.446**	2%
	D940	FB42	10	30	78	0.5236	1.000	1.688	**2.212**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**4.226**	740.230	739.420	0.93%	200	PVC	87.34	1.01	0.013	1.45	**31.586**	13%
	FB42	D9CE	10	40	104	0.6981	1.000	2.251	**2.949**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**4.963**	739.400	736.759	3.13%	200	PVC	84.46	1.85	0.013	0.76	**57.998**	9%
	D9CE	D93E	0	55	143	0.96	1.000	3.095	**4.055**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		16.11	1.6916	1.000	0.322	**2.014**			**6.069**	737.459	735.159	2.16%	250	PVC	106.57	1.78	0.013	1.00	**87.363**	7%
	13923	D9CE	15	15	39	0.2618	1.000	0.844	**1.106**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.106**	737.231	736.809	0.80%	200	PVC	53.05	0.93	0.013	0.95	**29.253**	4%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NW TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen	0.4	l/s/ha	Gen	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point 43.88 (measured by Draw down tests)

NW LS 127.7206 l/s

MANNINGS "n" VALUE: PVC 0.013; VCT 0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREAS	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data										
																																invert issue										
SOUTH RAILWAY DR AREA	EA33	EA32		0.00	0	0	1.000	0.000	**0.000**	0.39	0.39	0.1404	1.000	0.023	**0.164**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.164**	744.630	744.360	0.43%	200	PVC	62.73	0.68	0.013	1.53	**21.518**	1%
	EA32	D9E2		0.00	0	0	1.000	0.000	**0.000**	0.47	0.86	0.3096	1.000	0.052	**0.361**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.361**	744.360	743.303	2.76%	200	PVC	38.35	1.73	0.013	0.37	**54.451**	1%
	D9E2	D9E3		0.00	0	0	1.000	0.000	**0.000**	0.48	1.34	0.4824	1.000	0.080	**0.563**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.563**	743.343	742.908	0.40%	200	VCT	107.96	0.57	0.015	3.13	**18.043**	3%
	D9E3	D88A		0.00	0	0	1.000	0.000	**0.000**	0.84	2.18	0.7848	1.000	0.131	**0.916**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.916**	742.898	742.347	0.58%	200	VCT	94.78	0.69	0.015	2.29	**21.673**	4%
	D950	D9E1	6	6.00	15.6	0.1047	1.000	0.338	**0.442**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.442**	745.851	743.420	3.49%	200	PVC	69.59	1.95	0.013	0.59	**61.302**	1%
	D9E1	D88A	5	11.00	28.6	0.192	1.000	0.619	**0.811**	0.45	0.45	0.162	1.000	0.027	**0.189**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.000**	743.400	742.527	1.08%	200	PVC	80.75	1.09	0.013	1.24	**34.103**	3%
	D88A	D88B		11.00	28.6	0.192	1.000	0.619	**0.811**	0.65	3.28	1.1808	1.000	0.197	**1.378**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**2.189**	742.357	741.883	0.40%	200	VCT	118.31	0.57	0.015	3.44	**17.992**	12%
	D88B	D896		21.00	54.6	0.3665	1.000	1.182	**1.548**	0.71	4.83	1.7388	1.000	0.290	**2.029**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**3.577**	741.453	740.727	0.61%	200	VCT	118.14	0.71	0.015	2.78	**22.283**	16%
	D896	D895		41.00	106.6	0.7156	1.000	2.307	**3.023**	0.65	6.23	2.2428	1.000	0.374	**2.617**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**5.639**	740.727	740.351	0.35%	200	VCT	106.99	0.54	0.015	3.32	**16.851**	33%
	D9E0	D948																																								
	D9E0	D88B	10	10.00	26	0.1745	1.000	0.563	**0.737**	0.84	0.84	0.3024	1.000	0.050	**0.353**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.090**	745.344	741.723	2.63%	200	PVC	137.79	1.69	0.013	1.36	**53.169**	2%
	D946	D947	20	20.00	52	0.3491	1.000	1.125	**1.475**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.475**	745.970	743.390	1.98%	200	PVC	130.56	1.47	0.013	1.48	**46.106**	3%
	D947	D896		20.00	52	0.3491	1.000	1.125	**1.475**	0.75	0.75	0.27	1.000	0.045	**0.315**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.790**	743.360	740.727	2.19%	200	PVC	120.04	1.55	0.013	1.29	**48.575**	4%
	3A3F6	D895		0.00	0	0	1.000	0.000	**0.000**	0.73	0.73	0.2628	1.000	0.044	**0.307**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.307**	744.923	740.881	3.05%	200	PVC	132.5	1.82	0.013	1.21	**57.285**	1%
	D895	D894		41.00	106.6	0.7156	1.000	2.307	**3.023**		6.96	2.5056	1.000	0.418	**2.923**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**5.946**	740.321	740.055	0.54%	200	VCT	48.91	0.67	0.015	1.22	**20.963**	28%
	D890	D894		0.00	0	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	1.4	1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**0.840**	742.827	740.065	3.33%	200	VCT	83.04	1.65	0.015	0.84	**51.841**	2%
1 ST NE	D894	D9E4		41.00	106.6	0.7156	1.000	2.307	**3.023**	0.37	7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**6.941**	740.005	739.798	0.32%	200	VCT	64.15	0.51	0.015	2.08	**16.147**	43%
	D9E4	EC51		41.00	106.6	0.7156	1.000	2.307	**3.023**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**6.941**	739.788	739.270	1.22%	200	VCT	42.42	1.00	0.015	0.71	**31.411**	22%
	EC51	D9E5	5	46.00	119.6	0.8029	1.000	2.588	**3.391**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**7.310**	739.270	738.651	0.61%	200	VCT	101.72	0.71	0.015	2.40	**22.174**	33%
	D9E5	D9E6	5	51.00	132.6	0.8901	1.000	2.870	**3.760**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**7.679**	738.651	738.415	0.28%	200	VCT	84.62	0.48	0.015	2.95	**15.012**	51%
	D9E6	D9DC	5	56.00	145.6	0.9774	1.000	3.151	**4.129**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**8.047**	738.415	737.768	0.59%	200	VCT	110.44	0.69	0.015	2.66	**21.757**	37%
	D9E7	E9E6		0	0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.000**	738.696	738.415	0.80%	200	PVC	35.1	0.93	0.013	0.63	**29.346**	0%
MAIN ST	D9D2	D9D9	8	8	20.8	0.1396	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	738.446	738.128	0.41%	200	PVC	77.11	0.67	0.013	1.92	**21.063**	3%
	D9D9	D9DC	8	16	41.6	0.2793	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	738.118	737.798	0.42%	200	PVC	76.17	0.68	0.013	1.88	**21.259**	6%
	D9DF	D9DD	8	8	20.8	0.1396	1.000	0.450	**0.590**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.590**	738.231	738.007	0.44%	200	PVC	51.01	0.69	0.013	1.23	**21.734**	3%
	D9DD	D9DC	8	16	41.6	0.2793	1.000	0.900	**1.180**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.180**	737.987	737.748	0.47%	200	PVC	50.92	0.72	0.013	1.19	**22.470**	5%
	D9DC	D9DA	0	88.00	228.8	1.5359	1.000	4.952	**6.488**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**10.406**	737.668	737.172	0.45%	200	PVC	110.17	0.70	0.013	2.62	**22.007**	47%
1 ST NW	D9D1	D9D8	10.00	10.00	26	0.1745	1.000	0.563	**0.737**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**0.737**	739.064	737.940	1.30%	200	PVC	86.7	1.19	0.013	1.22	**37.345**	2%
	D9D8	D9DA	10	20.00	52	0.3491	1.000	1.125	**1.475**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**			**1.475**	737.930	737.352	0.95%	200	PVC	60.89	1.02	0.013	1.00	**31.955**	5%
	D9DE	D9DB	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	737.866	737.669	0.40%	200	PVC	49.5	0.66	0.013	1.25	**20.691**	4%
	D9DB	D9DA	10	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	737.649	737.272	0.69%	200	PVC	54.31	0.87	0.013	1.04	**27.326**	5%
	D9DA	D9D7	0	128.00	332.8	2.2341	1.000	7.203	**9.437**		7.33	2.6388	1.000	0.440	**3.079**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**13.355**	737.152	736.743	0.39%	200	PVC	105.33	0.65	0.013	2.70	**20.438**	65%
2 ST NW	3CA9F	D9D0	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	739.050	738.813	0.46%	200	PVC	51.7	0.71	0.013	1.22	**22.207**	3%
	D9D0	D9D7	10	20	52	0.3491	1.000	1.125	**1.475**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.475**	738.793	737.033	1.47%	200	PVC	119.8	1.27	0.013	1.58	**39.754**	4%
	D9D7	D9D6		148.00	384.8	2.5831	1.000	8.328	**10.911**	1.53	8.86	3.1896	1.000	0.532	**3.721**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**15.473**	736.743	736.269	0.45%	200	PVC	105.17	0.70	0.013	2.50	**22.019**	70%
	13924	D9D6	10	10	26	0.1745	1.000	0.563	**0.737**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**0.737**	737.308	736.269	1.03%	200	PVC	100.98	1.06	0.013	1.59	**33.269**	2%
	D9D6	D9D5		158.00	410.8	2.7577	1.000	8.891	**11.649**		8.86	3.1896	1.000	0.532	**3.721**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**			**16.210**	736.269	735.750	0.48%	200	PVC	108.14	0.72	0.013	2.49	**22.722**	71%
4 AVE NW	D9D3	D9D4		0	0	0	1.000	0.000	**0.000**	3.14	3.14	1.1304	1.000	0.188	**1.319**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**			**1.319**	736.267	735.946	0.32%	200	PVC	99.04	0.59	0.013	2.78	**18.672**	7%
	Future	D9D4																											**27.500**													
	D9D4	D9D5		0	0	0	1.000	0.000	**0.000**		3.14	1.1304	1.000	0.188	**1.319**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**27.500**		**28.819**	735.926	735.890	0.41%	200	PVC	8.71	0.67	0.013	0.22	**21.086**	137%
TO LS	D9D5	D9CF		158.00	410.8	2.7577	1.000	8.891	**11.649**		12.00	4.32	1.000	0.720	**5.040**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**	**27.500**		**45.029**	735.730	735.363	0.43%	200	PVC	84.85	0.69	0.013	2.06	**21.571**	209%
	D9CF	D93E		158.00	410.8	2.7577	1.000	8.891	**11.649**	0.54	12.54	4.5144	1.000	0.752	**5.267**		1.40	0.56	1.000	0.280	**0.840**		0.00	0	1.000	0.000	**0.000**	**27.500**		**45.255**	735.263	734.459	0.94%	200	PVC	85.71	1.01	0.013	1.41	**31.766**	142%
	D93E	D93F		319.00	829.4	5.5677	1.000	17.951	**23.518**		12.54	4.5144	1.000	0.752	**5.267**		25.99	10.396	1.000	5.198	**15.594**		16.11	1.6916	1.000	0.322	**2.014**	**81.328**		**127.721**	734.419	733.520	0.65%	500	PVC	138.18	1.55	0.013	1.48	**304.568**	42%
	D93F	DDIE		319.00	829.4	5.5677	1.000	17.951	**23.518**		12.54	4.5144	1.000	0.752	**5.267**		25.99	10.396	1.000	5.198	**15.594**		16.11	1.6916	1.000	0.322	**2.014**	**81.328**		**127.721**	733.520	733.480	0.25%	525	PVC	15.72	1.00	0.013	0.26	**216.938**	59%
	LS	E888		319.00	829.4	5.5677	1.000	17.951	**23.518**		12.54	4.5144	1.000	0.752	**5.267**		25.99	10.396	1.000	5.198	**15.594**		16.11	1.6916	1.000	0.322	**2.014**		**127.721**					250	PVC	1214.48		0.013		LS CAPACITY GOOD	

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NW TRUNK SYSTEM

		RESIDENTIAL	COMMERCIAL	HORTICULTURAL	INDUSTRIAL
Residential Average per capita daily flow:	580	Gen 0.36 l/s/ha	Gen 0.4 l/s/ha	Gen 0.105 l/s/ha
Assumed Persons Per household:	2.6	I/I 0.06 l/s/ha	I/I 0.2 l/s/ha	I/I 0.02 l/s/ha
Population:	5600			
Residential I/I (l/s/ha)	0.6			
Current Residential Area (ha)	202			

Existing Duty Point 43.88 (measured by Draw down tests)

NW LS	127.7206	l/s

MANNINGS "n" VALUE

PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL CONTRIBUTING LOTS	RESIDENTIAL TOTAL CONTRIBUTING LOTS	RESIDENTIAL ASSUMED NUMBER OF PERSONS	RESIDENTIAL Q Average	RESIDENTIAL PEAK FACTOR	RESIDENTIAL I/I ALLOWANCE (l/s)	**RESIDENTIAL FLOW (l/s)**	COMMERCIAL CONTRIBUTING AREAS	COMMERCIAL TOTAL CONTRIBUTING AREAS	COMMERCIAL Q Average	COMMERCIAL PEAK FACTOR	COMMERCIAL I/I ALLOWANCE (l/s)	**COMMERCIAL FLOW (l/s)**	HORTICULTURAL CONTRIBUTING AREAS	HORTICULTURAL TOTAL CONTRIBUTING AREAS	HORTICULTURAL Q Average	HORTICULTURAL PEAK FACTOR	HORTICULTURAL I/I ALLOWANCE (l/s)	**HORTICULTURAL FLOW (l/s)**	INDUSTRIAL CONTRIBUTING AREAS	INDUSTRIAL TOTAL CONTRIBUTING AREAS	INDUSTRIAL Q Average	INDUSTRIAL PEAK FACTOR	INDUSTRIAL I/I ALLOWANCE (l/s)	**INDUSTRIAL FLOW (l/s)**	**FUTURE FLOW (l/s)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																																new data										
																																invert issue										
TRUNK MAIN TO END	E888	E889		0.00	0	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**127.721**	742.258	741.777	0.37%	375	PVC	128.38	0.97	0.013	2.20	**107.320**	119%
	E889	E88A		0.00	0	0	1.000	0.000	**0.000**	0.93	0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	741.777	741.200	0.41%	375	PVC	140.95	1.02	0.013	2.31	**112.179**	114%
	E88A	E88B		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	741.200	740.778	0.39%	375	PVC	108.9	0.99	0.013	1.84	**109.144**	117%
	E88B	E88C		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	740.778	740.256	0.48%	375	PVC	109.22	1.10	0.013	1.66	**121.211**	106%
	E88C	E887		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	740.171	739.815	1.00%	375	PVC	35.74	1.58	0.013	0.38	**174.986**	73%
	E887	E886		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	740.399	739.964	0.55%	450	PVC	79.39	1.33	0.013	1.00	**211.042**	61%
	E886	D94E		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	739.964	739.409	0.52%	450	PVC	106.46	1.29	0.013	1.37	**205.854**	62%
	D94E	E884		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	739.409	739.159	0.23%	450	PVC	107.19	0.87	0.013	2.06	**137.689**	93%
	E884	E883		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**		**127.721**	**128.111**	739.159	738.032	1.28%	450	PVC	87.93	2.03	0.013	0.72	**322.775**	40%
	Future	E883																										**26.141**	**127.721**													
	E883	E882		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	738.032	736.757	0.95%	450	PVC	134.9	1.74	0.013	1.29	**277.176**	56%
	E882	E881		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	736.757	735.053	1.45%	450	PVC	117.24	2.16	0.013	0.90	**343.719**	45%
	E881	E880		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	735.053	734.241	1.11%	450	PVC	73.28	1.89	0.013	0.65	**300.118**	51%
	E880	E87F		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	734.241	733.231	1.22%	450	PVC	82.79	1.98	0.013	0.70	**314.904**	49%
	E87F	E87E		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	733.231	732.107	1.35%	450	PVC	83.13	2.08	0.013	0.66	**331.521**	47%
	E87E	E87D		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	732.107	730.691	1.25%	450	PVC	113.14	2.01	0.013	0.94	**318.956**	48%
	E87D	E87C		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	730.691	728.810	1.46%	450	PVC	129.04	2.16	0.013	0.99	**344.222**	45%
	E87C	E87B		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	728.810	727.314	1.60%	450	PVC	93.33	2.27	0.013	0.69	**360.962**	43%
	E87B	E87A		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	727.314	726.315	1.60%	450	PVC	62.56	2.27	0.013	0.46	**360.281**	43%
	E87A	E879		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	726.315	724.575	1.66%	450	PVC	105.07	2.31	0.013	0.76	**366.895**	42%
	E879	E878		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	724.575	724.050	0.54%	450	PVC	97.12	1.32	0.013	1.23	**209.620**	74%
	E878	E877		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**26.141**	**127.721**	**154.253**	724.050	723.664	0.63%	525	PVC	61.51	1.57	0.013	0.65	**340.684**	45%
	Future	E877																										**67.440**	**127.721**													
	E877	E876		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	723.664	723.197	0.58%	525	PVC	80.47	1.51	0.013	0.89	**327.622**	68%
	E876	E875		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	723.197	722.922	0.53%	750	PVC	52.08	1.83	0.013	0.47	**808.973**	27%
	Future	E875																											**127.721**													
	E875	E874		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	722.812	722.665	0.34%	750	PVC	43.56	1.46	0.013	0.50	**646.722**	34%
	E874	E873		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	722.635	722.400	0.23%	750	PVC	104.39	1.20	0.013	1.46	**528.211**	42%
	E873	E872		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	722.366	722.308	0.07%	750	PVC	82.88	0.67	0.013	2.07	**294.505**	75%
	E872	E871		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	722.308	722.230	0.07%	750	PVC	111.95	0.67	0.013	2.81	**293.859**	75%
	E871	E870		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	722.230	722.135	0.07%	750	PVC	135.06	0.67	0.013	3.37	**295.258**	75%
	E870	E86F		0.00	0	0	1.000	0.000	**0.000**		0.93	0.3348	1.000	0.056	**0.391**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**93.581**	**127.721**	**221.692**	722.135	722.068	0.07%	750	PVC	95.92	0.67	0.013	2.40	**294.229**	75%
		SUM	319	829.4						13.47						25.99						16.11																			
		CHECK	OK							OK						OK						OK																			

86-100%	1
100-150%	11
150-250%	4
>250%	1

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NORTH INDUSTRIAL TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

Existing Duty Point (Measured by drawdown tests): Semrau LS 4.9 l/s

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																																new data invert issue										
HIGHWAY AVE	EB43	EB42	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.69	0.69	0.0725	1.000	0.014	**0.086**			**0.086**	743.400	742.990	0.48%	200	PVC	85.23	0.72	0.013	1.96	**22.748**	0%
	EB42	EB41	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.27	0.96	0.1008	1.000	0.019	**0.120**			**0.120**	742.970	742.587	0.44%	200	PVC	86.34	0.70	0.013	2.07	**21.845**	1%
	EB41	EB40	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.29	1.25	0.1313	1.000	0.025	**0.156**			**0.156**	742.557	742.456	0.41%	200	PVC	24.5	0.67	0.013	0.61	**21.059**	1%
9 ST	EB3F	EB40	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.89	1.89	0.756	1.000	0.378	**1.134**	0	0	0	1.000	0.000	**0.000**			**1.134**	743.310	742.500	0.83%	200	PVC	98.02	0.95	0.013	1.72	**29.815**	4%
HIGHWAY AVE	EB40	EB3E	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	1.89	0.756	1.000	0.378	**1.134**	0.78	2.03	0.2132	1.000	0.041	**0.254**			**1.388**	742.446	741.880	0.49%	200	PVC	115.69	0.73	0.013	2.64	**22.941**	6%
	EB3E	DA80	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	1.89	0.756	1.000	0.378	**1.134**	0	2.03	0.2132	1.000	0.041	**0.254**			**1.388**	741.920	741.824	0.41%	200	VCT	23.17	0.58	0.015	0.66	**18.297**	8%
	DA80	13991	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	1.89	0.756	1.000	0.378	**1.134**	0.35	2.38	0.2499	1.000	0.048	**0.298**			**1.432**	741.804	741.339	0.41%	200	VCT	112.53	0.58	0.015	3.22	**18.272**	8%
	DA89	DA8A	0	0	0	0	1.000	0.000	**0.000**	0.78	0.78	0.281	1.000	0.047	**0.328**	0.39	0.39	0.156	1.000	0.078	**0.234**	0	0	0	1.000	0.000	**0.000**			**0.562**	742.968	742.518	0.50%	200	VCT	89.97	0.64	0.015	2.34	**20.103**	3%
	DA8A	DA82	0	0	0	0	1.000	0.000	**0.000**	0	0.78	0.281	1.000	0.047	**0.328**	0	0.39	0.156	1.000	0.078	**0.234**	4.09	4.09	0.4295	1.000	0.082	**0.511**			**1.073**	742.478	741.960	0.51%	200	VCT	101.11	0.65	0.015	2.60	**20.346**	5%
	DA82	DA84	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	0.39	0.156	1.000	0.078	**0.234**	0.38	4.47	0.4694	1.000	0.089	**0.559**			**1.301**	741.920	741.658	0.45%	200	VCT	57.63	0.61	0.015	1.57	**19.166**	7%
	DA84	13991	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	0.39	0.156	1.000	0.078	**0.234**	0.35	4.82	0.5061	1.000	0.096	**0.603**			**1.345**	741.648	741.319	0.40%	200	VCT	81.41	0.58	0.015	2.36	**18.070**	7%
11 ST	DA83	DA82	0	0	0	0	1.000	0.000	**0.000**	0.43	0.43	0.155	1.000	0.026	**0.181**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**0.181**	742.247	741.940	0.41%	200	VCT	74.86	0.58	0.015	2.15	**18.203**	1%
SASKATCHEWAN DR	13991	D90B	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	2.28	0.912	1.000	0.456	**1.368**	0.75	7.95	0.8348	1.000	0.159	**0.994**			**2.870**	741.299	740.919	0.50%	200	VCT	76.09	0.64	0.015	1.98	**20.088**	14%
	D90B	D90A	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	2.28	0.912	1.000	0.456	**1.368**	0	7.95	0.8348	1.000	0.159	**0.994**			**2.870**	740.899	740.381	0.44%	200	VCT	117.79	0.60	0.015	3.27	**18.850**	15%
	D90A	D909	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	2.28	0.912	1.000	0.456	**1.368**	0	7.95	0.8348	1.000	0.159	**0.994**			**2.870**	740.371	740.078	0.36%	200	VCT	81.25	0.54	0.015	2.49	**17.070**	17%
	D909	D908	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	3.9	6.18	2.472	1.000	1.236	**3.708**	0	7.95	0.8348	1.000	0.159	**0.994**			**5.210**	740.078	739.494	0.50%	200	VCT	117.3	0.64	0.015	3.06	**20.057**	26%
	D908	D901	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0.4	6.58	2.632	1.000	1.316	**3.948**	0	7.95	0.8348	1.000	0.159	**0.994**			**5.450**	739.494	737.906	1.81%	200	VCT	87.77	1.22	0.015	1.20	**38.235**	14%
	D901	D900	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0.68	7.26	2.904	1.000	1.452	**4.356**	0.95	8.9	0.9345	1.000	0.178	**1.113**			**5.977**	737.906	737.434	0.42%	300	VCT	112.05	0.77	0.015	2.43	**54.394**	11%
	D900	D8FF	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0.48	7.74	3.096	1.000	1.548	**4.644**	0	8.9	0.9345	1.000	0.178	**1.113**			**6.265**	737.404	736.870	0.52%	300	VCT	103.14	0.85	0.015	2.02	**60.303**	10%
	DA7F	D8FF	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.65	1.65	0.1733	1.000	0.033	**0.206**			**0.206**	737.115	736.880	0.26%	300	VCT	89.32	0.61	0.015	2.45	**42.987**	0%
	D8FF	D8FE	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	0	10.55	1.1078	1.000	0.211	**1.319**			**6.471**	736.870	736.194	1.13%	300	VCT	59.58	1.26	0.015	0.79	**89.270**	7%
	D8FE	D8FD	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	1.7	12.25	1.2863	1.000	0.245	**1.531**			**6.683**	736.194	735.147	1.10%	300	VCT	94.79	1.25	0.015	1.27	**88.079**	8%
	D8FD	D8FC	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	1.1	13.35	1.4018	1.000	0.267	**1.669**			**6.821**	735.147	734.256	0.95%	300	VCT	93.63	1.16	0.015	1.35	**81.755**	8%
	D8FC	D8FB	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	0	13.35	1.4018	1.000	0.267	**1.669**			**6.821**	734.256	733.243	1.07%	300	VCT	94.48	1.23	0.015	1.28	**86.779**	8%
	D8FB	D8FA	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	1.53	14.88	1.5624	1.000	0.298	**1.860**			**7.012**	733.243	732.850	0.49%	300	VCT	79.45	0.83	0.015	1.59	**58.943**	12%
	D8FA	D89D	0	0	0	0	1.000	0.000	**0.000**	0	1.21	0.436	1.000	0.073	**0.508**	0	7.74	3.096	1.000	1.548	**4.644**	0.37	15.25	1.6013	1.000	0.305	**1.906**			**7.058**	734.493	732.850	1.97%	300	VCT	83.3	1.67	0.015	0.83	**117.700**	6%
PEMBINA DR/CRES	D910	D911	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.85	0.85	0.34	1.000	0.170	**0.510**	0	0	0	1.000	0.000	**0.000**			**0.510**	740.684	739.733	1.02%	200	VCT	92.96	0.92	0.015	1.69	**28.751**	2%
	D911	D912	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.8	0.8	0.084	1.000	0.016	**0.100**			**0.610**	739.733	738.907	0.87%	200	VCT	94.44	0.85	0.015	1.86	**26.584**	2%
	D912	D913	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	1.56	2.36	0.2478	1.000	0.047	**0.295**			**0.805**	738.907	738.126	0.82%	200	VCT	95.54	0.82	0.015	1.95	**25.700**	3%
	D913	D904	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.9	3.26	0.3423	1.000	0.065	**0.408**			**0.918**	738.126	737.557	0.95%	200	VCT	59.72	0.88	0.015	1.13	**27.746**	3%
	D910	D902	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.91	0.91	0.0956	1.000	0.018	**0.114**			**0.114**	740.684	740.013	1.12%	200	VCT	59.99	0.96	0.015	1.04	**30.063**	0%
	D902	D903	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.91	0.0956	1.000	0.018	**0.114**			**0.114**	740.013	738.766	1.12%	200	VCT	111.58	0.96	0.015	1.94	**30.050**	0%
	D903	D904	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.95	1.86	0.1953	1.000	0.037	**0.233**			**0.233**	738.766	737.557	1.18%	200	VCT	102.73	0.98	0.015	1.74	**30.837**	1%
	D904	D905	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.93	6.05	0.6353	1.000	0.121	**0.756**			**1.266**	737.557	736.830	1.22%	200	VCT	59.64	1.00	0.015	1.00	**31.384**	4%
	D905	D906	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	1.14	7.19	0.755	1.000	0.144	**0.899**			**1.409**	736.830	736.442	0.41%	200	VCT	93.57	0.58	0.015	2.68	**18.304**	8%
	D906	D907	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.37	7.56	0.7938	1.000	0.151	**0.945**			**1.455**	736.442	735.950	0.61%	200	VCT	80.07	0.71	0.015	1.88	**22.282**	7%
	D907	D89C	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0.85	0.34	1.000	0.170	**0.510**	0.43	7.99	0.839	1.000	0.160	**0.999**			**1.509**	735.950	735.413	0.65%	200	VCT	82.65	0.73	0.015	1.89	**22.912**	7%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NORTH INDUSTRIAL TRUNK SYSTEM

	RESIDENTIAL	COMMERCIAL		HORTICULTURAL		INDUSTRIAL	
Residential Average per capita daily flow:	580	Gen	0.36 l/s/ha	Gen.	0.4 l/s/ha	Gen.	0.105 l/s/ha
Assumed Persons Per household:	2.6	I/I	0.06 l/s/ha	I/I	0.2 l/s/ha	I/I	0.02 l/s/ha
Population:	5600						
Residential I/I (l/s/ha)	0.6						
Current Residential Area (ha)	202						

Existing Duty Point (Measured by drawdown tests)

Semrau LS	4.9	l/s	

MANNINGS "n" VALUE

PVC	0.013
VCT	0.015

SEGMENT	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	COMMERCIAL: CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	HORTICULTURAL: CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	INDUSTRIAL: CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	FLOW (l/s)	FUTURE FLOW (l/s)	LIFT STATION DISCHARGE	DESIGN FLOW (l/s)	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	CAPACITY OF PIPE (dm3/s = l/s)	% HYDRAULIC CAPACITY
																															new data										
																															invert issue										
BROADWAY AVE	47104	DA8D	0	0	0	0	1.000	0.000	**0.000**	0.57	0.57	0.205	1.000	0.034	**0.239**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**0.239**	740.450	739.240	1.66%	200	PVC	72.99	1.34	0.013	0.91	**42.229**	1%
	DA8D	DA8C	0	0	0	0	1.000	0.000	**0.000**	0	0.57	0.205	1.000	0.034	**0.239**	0	0	0	1.000	0.000	**0.000**	0.56	0.56	0.0588	1.000	0.011	**0.070**			**0.309**	739.182	738.171	0.92%	200	VCT	110.18	0.87	0.015	2.12	**27.229**	1%
	DA8C	D89B	0	0	0	0	1.000	0.000	**0.000**	1.5	2.07	0.745	1.000	0.124	**0.869**	0	0	0	1.000	0.000	**0.000**	0.55	1.11	0.1166	1.000	0.022	**0.139**			**1.008**	738.151	737.123	0.93%	200	VCT	110.24	0.87	0.015	2.10	**27.449**	4%
	D89B	D89C	0	0	0	0	1.000	0.000	**0.000**	0	2.07	0.745	1.000	0.124	**0.869**	0	0	0	1.000	0.000	**0.000**	1.79	2.9	0.3045	1.000	0.058	**0.363**			**1.232**	736.953	735.413	1.41%	200	VCT	109.44	1.07	0.015	1.70	**33.719**	4%
	D89C	D89D	0	0	0	0	1.000	0.000	**0.000**	0	2.07	0.745	1.000	0.124	**0.869**	0	0.85	0.34	1.000	0.170	**0.510**	0	10.89	1.1435	1.000	0.218	**1.361**			**2.741**	735.413	734.483	0.78%	200	VCT	119.92	0.80	0.015	2.51	**25.032**	11%
	D89D	DAD4	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	4.79	30.93	3.2477	1.000	0.619	**3.866**			**10.398**	734.473	731.834	2.74%	300	VCT	96.24	1.96	0.015	0.82	**138.779**	7%
	DAD4	D899	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.64	32.57	3.4199	1.000	0.651	**4.071**			**10.603**	731.834	731.242	0.71%	300	VCT	83.36	1.00	0.015	1.39	**70.626**	15%
DIRKSON DR	DA12	DA13	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.33	2.33	0.2447	1.000	0.047	**0.291**			**0.291**	739.779	738.897	0.61%	250	PVC	145.6	0.94	0.013	2.57	**46.284**	1%
	DA13	DA14	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	7.85	10.18	1.0689	1.000	0.204	**1.273**			**1.273**	738.867	738.117	0.60%	250	PVC	124.71	0.94	0.013	2.21	**46.117**	3%
	DA14	DA15	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.92	12.1	1.2705	1.000	0.242	**1.513**			**1.513**	738.087	737.301	0.60%	250	PVC	130.9	0.94	0.013	2.32	**46.081**	3%
	DA15	DA16	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.84	14.94	1.5687	1.000	0.299	**1.868**			**1.868**	737.271	736.105	1.01%	250	PVC	115.32	1.22	0.013	1.58	**59.797**	3%
	DA16	DA17	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	8.09	23.03	2.4182	1.000	0.461	**2.879**			**2.879**	736.075	735.058	0.99%	250	PVC	102.83	1.20	0.013	1.42	**59.140**	5%
	DA17	DA18	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	23.03	2.4182	1.000	0.461	**2.879**			**2.879**	735.028	734.583	0.60%	250	PVC	74.2	0.94	0.013	1.32	**46.053**	6%
	DA18	DA19	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.57	25.6	2.688	1.000	0.512	**3.200**			**3.200**	734.553	733.936	0.60%	250	PVC	102.71	0.94	0.013	1.82	**46.091**	7%
	DA19	DA1A	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	4.05	29.65	3.1133	1.000	0.593	**3.706**			**3.706**	733.908	733.190	0.60%	250	PVC	119.79	0.94	0.013	2.13	**46.040**	8%
	DA1A	D972	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	29.65	3.1133	1.000	0.593	**3.706**			**3.706**	733.150	732.670	0.40%	250	PVC	119.9	0.77	0.013	2.61	**37.626**	10%
	D973	D972	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	7.25	7.25	0.7613	1.000	0.145	**0.906**			**0.906**	733.590	732.720	0.73%	250	PVC	119.29	1.03	0.013	1.92	**50.785**	2%
ELBOW DR	D972	D971	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	3.33	40.23	4.2242	1.000	0.805	**5.029**			**5.029**	732.620	732.300	0.28%	200	PVC	115.34	0.55	0.013	3.50	**17.276**	29%
	D971	D970	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.91	42.14	4.4247	1.000	0.843	**5.268**			**5.268**	732.300	731.990	0.26%	200	PVC	119.73	0.53	0.013	3.76	**16.689**	32%
	D970	D96F	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.36	44.5	4.6725	1.000	0.890	**5.563**			**5.563**	731.990	731.730	0.22%	200	PVC	120.81	0.48	0.013	4.16	**15.216**	37%
	D96F	D96E	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.59	46.09	4.8395	1.000	0.922	**5.761**			**5.761**	731.730	731.440	0.27%	200	PVC	108.78	0.54	0.013	3.36	**16.935**	34%
	D96E	D899	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	2.45	48.54	5.0967	1.000	0.971	**6.068**			**6.068**	731.430	731.232	0.19%	200	PVC	103.72	0.46	0.013	3.79	**14.330**	42%
	D899	D898	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.62	82.73	8.6867	1.000	1.655	**10.341**			**16.873**	731.242	729.319	1.05%	300	VCT	182.63	1.22	0.015	2.50	**85.997**	20%
20 ST	D897	D898	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.74	0.74	0.0777	1.000	0.015	**0.093**			**0.093**	731.549	729.369	2.11%	300	VCT	103.48	1.72	0.015	1.00	**121.642**	0%
	Future	D898																										235.642													
	D898	D9A3	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.02	84.49	8.8715	1.000	1.690	**10.561**	235.642		**252.735**	729.309	729.055	0.22%	300	VCT	116.17	0.55	0.015	3.49	**39.188**	645%
	D9A3	D915	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	0.36	84.85	8.9093	1.000	1.697	**10.606**	235.642		**252.780**	729.025	728.733	0.24%	300	VCT	119.88	0.59	0.015	3.41	**41.362**	611%
	D915	D887	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	0	84.85	8.9093	1.000	1.697	**10.606**	235.642		**252.780**	728.703	728.557	0.12%	300	VCT	119.85	0.41	0.015	4.83	**29.251**	864%
INDUSTRIAL DR	D88E	D88D	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.46	1.46	0.1533	1.000	0.029	**0.183**			**0.183**	733.352	732.079	1.21%	200	VCT	105.54	0.99	0.015	1.77	**31.218**	1%
	D88D	D88C	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.44	1.9	0.1995	1.000	0.038	**0.238**			**0.238**	732.039	731.686	0.48%	200	VCT	73.67	0.63	0.015	1.96	**19.676**	1%
	D88C	D889	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.35	2.25	0.2363	1.000	0.045	**0.281**			**0.281**	731.676	730.921	0.86%	200	VCT	87.87	0.84	0.015	1.75	**26.349**	1%
	D889	D888	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	3.38	5.63	0.5912	1.000	0.113	**0.704**			**0.704**	730.931	730.135	0.92%	200	VCT	86.07	0.87	0.015	1.65	**27.336**	3%
	D888	D887	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0.73	6.36	0.6678	1.000	0.127	**0.795**			**0.795**	730.115	729.727	0.68%	200	VCT	57.2	0.75	0.015	1.28	**23.411**	3%
20 ST	D887	D914	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	0	91.21	9.5771	1.000	1.824	**11.401**	235.642		**253.575**	728.527	728.186	0.22%	300	VCT	151.97	0.56	0.015	4.51	**39.699**	639%
	D914	D91B	0	0	0	0	1.000	0.000	**0.000**	0	3.28	1.181	1.000	0.197	**1.378**	0	8.59	3.436	1.000	1.718	**5.154**	1.48	92.69	9.7325	1.000	1.854	**11.586**	235.642		**253.760**	728.186	727.825	0.23%	300	VCT	155.95	0.57	0.015	4.56	**40.322**	629%
	D91B	D9A4	0	0	0	0	1.000	0.000	**0.000**	0	3.78	1.361	1.000	0.227	**1.588**	0	8.59	3.436	1.000	1.718	**5.154**	0	97.26	10.212	1.000	1.945	**12.158**	235.642		**254.541**	727.825	725.730	2.22%	300	VCT	94.24	1.77	0.015	0.89	**124.956**	204%
HIGHWAY AVE	D919	D918	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**0.000**	737.660	736.350	1.44%	200	VCT	90.85	1.09	0.015	1.39	**34.133**	0%
	D918	D88F	0	0	0	0	1.000	0.000	**0.000**	0.5	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	0.24	0.24	0.0252	1.000	0.005	**0.030**			**0.240**	736.350	734.938	0.58%	200	VCT	241.49	0.69	0.015	5.82	**21.736**	1%
	D88F	D917	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	1.93	2.17	0.2279	1.000	0.043	**0.271**			**0.481**	734.918	730.891	1.67%	200	VCT	241.24	1.17	0.015	3.44	**36.726**	1%
	D917	D916	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	1.2	3.37	0.3539	1.000	0.067	**0.421**			**0.631**	730.871	729.552	1.10%	200	VCT	120.07	0.95	0.015	2.11	**29.793**	2%
	D916	D91A	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	1.2	4.57	0.4799	1.000	0.091	**0.571**			**0.781**	729.522	728.277	1.04%	200	VCT	119.77	0.92	0.015	2.16	**28.981**	3%
	D91A	D91B	0	0	0	0	1.000	0.000	**0.000**	0	0.5	0.18	1.000	0.030	**0.210**	0	0	0	1.000	0.000	**0.000**	0	4.57	0.4799	1.000	0.091	**0.571**			**0.781**	728.247	727.825	0.35%	200	VCT	119.56	0.54	0.015	3.71	**16.888**	5%

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

NORTH INDUSTRIAL TRUNK SYSTEM

	RESIDENTIAL			COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580		Gen	0.36	l/s/ha	Gen.	0.4	l/s/ha	Gen.	0.105	l/s/ha	Existing Duty Point (Measured by drawdown tests)
Assumed Persons Per household:	2.6		I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha	Semrau LS 4.9 l/s
Population:	5600											
Residential I/I (l/s/ha)	0.6											
Current Residential Area (ha)	202											

MANNINGS "n" VALUE	
PVC	0.013
VCT	0.015

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																			
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE FLOW (l/s)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**
																															new data										
																															invert issue										
SOUTH HIGHWAAY DR	D983	D984	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.43	1.43	0.1502	1.000	0.029	**0.179**			**0.179**	735.308	734.392	0.90%	200	PVC	101.42	0.99	0.013	1.70	**31.170**	1%
	D984	D985	0	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**	1.49	2.92	0.3066	1.000	0.058	**0.365**			**0.365**	734.392	733.436	0.80%	200	PVC	119.63	0.93	0.013	2.14	**29.320**	1%
	D985	D986	0	0	0	0	1.000	0.000	**0.000**	0.86	0.86	0.31	1.000	0.052	**0.361**	0	0	0	1.000	0.000	**0.000**	0	2.92	0.3066	1.000	0.058	**0.365**			**0.726**	733.436	731.642	1.48%	200	PVC	121.09	1.27	0.013	1.59	**39.922**	2%
	D986	D987	0	0	0	0	1.000	0.000	**0.000**	0	0.86	0.31	1.000	0.052	**0.361**	0	0	0	1.000	0.000	**0.000**	0	2.92	0.3066	1.000	0.058	**0.365**			**0.726**	731.642	730.460	0.93%	200	PVC	126.53	1.01	0.013	2.09	**31.700**	2%
	D987	D988	0	0	0	0	1.000	0.000	**0.000**	2.24	3.1	1.116	1.000	0.186	**1.302**	0	0	0	1.000	0.000	**0.000**	0	2.92	0.3066	1.000	0.058	**0.365**			**1.667**	730.460	729.107	1.08%	200	PVC	125.82	1.08	0.013	1.94	**34.012**	5%
	D988	D989	0	0	0	0	1.000	0.000	**0.000**	0	3.1	1.116	1.000	0.186	**1.302**	0	0	0	1.000	0.000	**0.000**	0	2.92	0.3066	1.000	0.058	**0.365**			**1.667**	729.107	726.836	2.23%	200	PVC	101.68	1.56	0.013	1.09	**49.017**	3%
	D989	D9A4	0	0	0	0	1.000	0.000	**0.000**	2.33	5.43	1.955	1.000	0.326	**2.281**	0	0	0	1.000	0.000	**0.000**	0	2.92	0.3066	1.000	0.058	**0.365**			**2.646**	726.846	726.040	0.67%	200	VCT	120.26	0.74	0.015	2.71	**23.271**	11%
20 ST	D9A4	15216	0	0	0	0	1.000	0.000	**0.000**	0	9.21	3.316	1.000	0.553	**3.868**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**		**257.187**	725.730	724.560	1.45%	300	VCT	80.7	1.43	0.015	0.94	**100.911**	255%
	15216	15203	0	0	0	0	1.000	0.000	**0.000**	0	9.21	3.316	1.000	0.553	**3.868**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**		**257.187**	724.550	723.800	0.71%	300	PVC	105.99	1.15	0.013	1.54	**81.344**	316%
SAAMIS DR	D98B	D98C	0	0	0	0	1.000	0.000	**0.000**	3.2	3.2	1.152	1.000	0.192	**1.344**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**1.344**	721.933	721.591	0.61%	200	PVC	55.83	0.82	0.013	1.14	**25.670**	5%
	D98C	D98D	0	0	0	0	1.000	0.000	**0.000**	0	3.2	1.152	1.000	0.192	**1.344**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**1.344**	721.511	720.996	0.44%	200	PVC	117.71	0.69	0.013	2.84	**21.695**	6%
	D98D	D98E	0	0	0	0	1.000	0.000	**0.000**	2.94	6.14	2.21	1.000	0.368	**2.579**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**2.579**	720.956	720.411	0.45%	200	PVC	120.69	0.70	0.013	2.87	**22.040**	12%
	D98E	D98F	0	0	0	0	1.000	0.000	**0.000**	1.01	7.15	2.574	1.000	0.429	**3.003**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**3.003**	720.391	717.068	2.75%	200	PVC	121.05	1.73	0.013	1.17	**54.342**	6%
	D990	D98F	0	0	0	0	1.000	0.000	**0.000**	3.68	3.68	1.325	1.000	0.221	**1.546**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**1.546**	716.660	716.028	0.52%	200	PVC	121.71	0.75	0.013	2.70	**23.635**	7%
	LS	D98A	0	0	0	0	1.000	0.000	**0.000**	0	10.83	3.899	1.000	0.650	**4.549**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**			**4.549**				75	PVC	542.86		0.013		LS CAPACITY GOOD	
	D98A	15203	0	0	0	0	1.000	0.000	**0.000**	1.14	1.14	0.41	1.000	0.068	**0.479**	0	0	0	1.000	0.000	**0.000**	0	0	0	1.000	0.000	**0.000**		**4.900**	**5.379**	724.069	723.980	0.34%	200	PVC	26.33	0.61	0.013	0.72	**19.069**	28%
TO END	15203	15208	0	0	0	0	1.000	0.000	**0.000**	0	10.35	3.726	1.000	0.621	**4.347**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**	**4.900**	**262.566**	723.760	723.260	0.66%	300	PVC	76.28	1.11	0.013	1.15	**78.291**	335%
	15208	D94D	0	0	0	0	1.000	0.000	**0.000**	0	10.35	3.726	1.000	0.621	**4.347**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**	**4.900**	**262.566**	723.280	722.933	0.83%	300	PVC	41.71	1.25	0.013	0.56	**88.201**	298%
	D94D	D94C	0	0	0	0	1.000	0.000	**0.000**	0	10.35	3.726	1.000	0.621	**4.347**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**	**4.900**	**262.566**	722.933	722.726	0.17%	300	VCT	118.84	0.49	0.015	4.00	**34.977**	751%
	D94C	D94B	0	0	0	0	1.000	0.000	**0.000**	0	10.35	3.726	1.000	0.621	**4.347**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**	**4.900**	**262.566**	722.666	722.560	0.07%	375	VCT	151.07	0.36	0.015	6.91	**40.251**	652%
	D94B	D94A	0	0	0	0	1.000	0.000	**0.000**	0	10.35	3.726	1.000	0.621	**4.347**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**	**4.900**	**262.566**	722.520	722.303	0.15%	375	VCT	148.74	0.53	0.015	4.72	**58.040**	452%
	D94A	D949	0	0	0	0	1.000	0.000	**0.000**	0	10.35	3.726	1.000	0.621	**4.347**	0	8.59	3.436	1.000	1.718	**5.154**	0	100.18	10.519	1.000	2.004	**12.523**	**235.642**	**4.900**	**262.566**	722.263	721.984	0.18%	375	VCT	150.82	0.59	0.015	4.25	**65.355**	402%
		SUM	0							21.2						8.59						100.2																		86-100%	0
		CHECK	OK							OK						OK						OK																		100-150%	0
																																								150-250%	1
																																								>250%	13

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

TO CITY GATE

	RESIDENTIAL	COMMERCIAL			HORTICULTURAL			INDUSTRIAL		
Residential Average per capita daily flow:	580	Gen	0.36	l/s/ha	Gen	0.4	l/s/ha	Gen	0.11	l/s/ha
Assumed Persons Per household	2.6	I/I	0.06	l/s/ha	I/I	0.2	l/s/ha	I/I	0.02	l/s/ha
Population:	5600.0									
Residential I/I (l/s/ha)	0.6									
Current Residential Area (ha)	202									

MANNINGS "n" VALUE

PVC	0.013	
VCT	0.015	

			RESIDENTIAL							COMMERCIAL						HORTICULTURAL						INDUSTRIAL																					
SEGMENT	UPSTREAM MH	DOWNSTREAM MH	CONTRIBUTING LOTS	TOTAL CONTRIBUTING LOTS	ASSUMED NUMBER OF PERSONS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREAS (ha)	TOTAL CONTRIBUTING AREAS (ha)	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**FUTURE (SEE TAB)**	**LIFT STATION DISCHARGE**	**DESIGN FLOW (l/s)**	UPSTREAM INVERT (m)	DOWNSTREAM INVERT (m)	SLOPE (%)	NOMINAL PIPE DIAMETER (mm)	PIPE MATERIAL	LENGTH OF PIPE RUN (m)	VELOCITY FLOWING FULL (m/s)	MANNINGS "n" VALUE	TIME OF FLOW (min)	**CAPACITY OF PIPE (dm3/s = l/s)**	**% HYDRAULIC CAPACITY**	
																															new data												
																															invert issue												.
	DA03	E86F	0	1504	3910.4	26.2504	1.000	84.632	**110.883**		6.73	2.4228	1.000	0.404	**2.827**		0	0	1.000	0.000	**0.000**		0	0	1.000	0.000	**0.000**	**74.633**	**60.835**	**249.178**	722.377	722.038	0.78%	375	VCT	43.5	1.21	0.015	0.60	**134.142**	186%	722.377
	E86F	D949	0	1504.00	3910.4	26.2504	1.000	84.632	**110.883**		7.66	2.7576	1.000	0.460	**3.217**		0.00	0	1.000	0.000	**0.000**		0.00	0	1.000	0.000	**0.000**	**168.214**	**188.556**	**470.870**	722.028	721.994	0.87%	375	VCT	3.9	1.28	0.015	0.05	**141.878**	332%	722.028
	D949	DA0F	0	1504.00	3910.4	26.2504	1.000	84.632	**110.883**		18.01	6.4836	1.000	1.081	**7.564**		8.59	3.436	1.000	1.718	**5.154**		100.18	10.52	1.000	2.004	**12.523**	**403.857**	**193.456**	**733.435**	721.984	721.500	1.45%	375	VCT	33.34	1.66	0.015	0.34	**183.083**	401%	721.984
			sum	1504.00							18.01						8.59						100.18																				
			check	OK							OK						OK						OK																				

86-100%	0
100-150%	0
150-250%	1
>250%	2

*NOTE: When using "Calibrated" scenerios for existing, there is no calculated peak factors for peak sewage generaton. The peak factors are calibrated into the inputs.

FUTURE FLOWS

(Stantec Eastside FSR)

RESIDENTIAL		COMMERCIAL	INDUSTRIAL
Residential Average per capita daily flow:	300 l/cap/day	Gen 0.2 l/s/ha	Gen. 0.15 l/s/ha
Population Density:	29.7 persons/ha	I/I 0.1 l/s/ha	I/I 0.1 l/s/ha
Residential I/I (l/s/ha)	0.16 l/s/ha		
Low Density	24 persons/ha		
		Total Population:	**14690.8**

		RESIDENTIAL							COMMERCIAL						INDUSTRIAL/HORTICULTURAL						
SEGMENT	DOWNSTREAM MH	TOTAL AREA (ha)	TOTAL CONTRIBUTING LOTS	Total Population	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	CONTRIBUTING AREA (ha)	TOTAL CONTRIBUTING AREAS	Q Average	PEAK FACTOR	I/I ALLOWANCE (l/s)	**FLOW (l/s)**	**TOTAL**
NORTHSIDE	D898			0.0	0.0	4.5	0.0	**0**	10	10.00	2	5.000	1.000	**11.000**	368.90	368.900	55.335	3.393	36.890	**224.642**	**235.642**
EASTSIDE	E883	30.74	30.74	913.0	12.1259	3.825	4.918	**17.044**	8.27	8.27	1.654	5.000	0.827	**9.097**	0.00	0.000	0	1.000	0.000	**0.000**	**26.141**
	E877	75.53	75.53	2243.2	27.6238	3.546	12.085	**39.709**	25.21	25.21	5.042	5.000	2.521	**27.731**	0.00	0.000	0	1.000	0.000	**0.000**	**67.440**
	DA04	15.98	15.98	474.6	6.56829	3.986	2.557	**9.125**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**9.125**
	DA0A	36.68	36.68	1089.4	14.2821	3.776	5.869	**20.151**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**20.151**
NORTH GATEWAY	D9D4	0	0	0.0	0	4.500	0.000	**0.000**	25	25.00	5	5.000	2.500	**27.500**	0.00	0.000	0	1.000	0.000	**0.000**	**27.500**
NORTHEND	D9B2	50	50	1485.0	18.989	3.683	8.000	**26.989**	0	0.00	0	1.000	0.000	**0.000**	20.00	20.000	3	5.000	2.000	**17.000**	**43.989**
WESTEND	D9B2	20	20	480.0	6.6388	3.983	3.200	**9.839**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**9.839**
BAYLISS	DA02	0	0	0.0	0	4.500	0.000	**0.000**	0	0.00	0	1.000	0.000	**0.000**	20.00	20.000	3	5.000	2.000	**17.000**	**17.000**
RIVER TERRACE	D8BB	100	100	2400.0	29.3574	3.523	16.000	**45.357**	0	0.00	0	1.000	0.000	**0.000**	0.00	0.000	0	1.000	0.000	**0.000**	**45.357**

APPENDIX D

Cost Estimates

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate - Area 1

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 20,000.00	$ 20,000.00
2	Traffic Accommodation/ Detour	1	LS	$ 10,000.00	$ 10,000.00
		SUBTOTAL			$ 30,000.00
Area 1					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	104	m	$ 20.00	$ 2,080.00
2.2	Remove and Dispose of Existing Sanitary Manhole	2	each	$ 600.00	$ 1,200.00
2.3	Supply and Install Sanitary Sewer, 375 mm PVC	104	m	$ 425.00	$ 44,200.00
2.4	Supply and Install Sanitary Sewer Manhole	2	each	$ 10,000.00	$ 20,000.00
2.5	Tie to Existing Sanitary Sewer	5	each	$ 2,500.00	$ 12,500.00
2.6	Sanitary Sewer Bypass Pumping	1	LS	$ 10,000.00	$ 10,000.00
2.7	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 2,000.00	$ 2,000.00
2.8	Sub-grade Preparation- 150mm Depth	1,050	m^2	$ 4.00	$ 4,200.00
2.9	Supply and Install Granular Sub-base- 150mm Compacted Depth	1,050	m^2	$ 9.00	$ 9,450.00
2.10	Supply and Install Granular Base- 75mm Compacted Depth	1,050	m^2	$ 8.00	$ 8,400.00
2.11	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	1,050	m^2	$ 25.00	$ 26,250.00
2.12	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	1,050	m^2	$ 20.00	$ 21,000.00
2.13	Adjustment of Appurtenances:				
	(a) Manhole	2	each	$ 500.00	$ 1,000.00
	(b) Valve	2	each	$ 500.00	$ 1,000.00
		SUBTOTAL			$ 163,000.00
		GRAND SUBTOTAL			**$ 193,000.00**
TOTAL CONTINGENCY (30%)					$ 58,000.00
TOTAL ENGINEERING (15%)					$ 38,000.00
		GRAND TOTAL			**$ 289,000.00**

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate - Area 2

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 25,000.00	$ 25,000.00
2	Traffic Accomodation/ Detour	1	LS	$ 15,000.00	$ 15,000.00
		SUBTOTAL			$ 40,000.00
Area 2					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	260	m	$ 20.00	$ 5,200.00
2.2	Remove and Dispose of Existing Sanitary Manhole	5	each	$ 600.00	$ 3,000.00
2.3	Supply and Install Sanitary Sewer 300mm PVC	260	m	$ 400.00	$ 104,000.00
2.4	Supply and Install Sanitary Sewer Manhole	5	each	$ 10,000.00	$ 50,000.00
2.5	Tie to Existing Sanitary Sewer	2	each	$ 2,500.00	$ 5,000.00
2.6	Tie to 450mm Sanitary Sewer Main	1	each	$ 7,500.00	$ 7,500.00
2.7	Tie to Existing Sanitary Sewer Lateral	16	each	$ 750.00	$ 12,000.00
2.8	Sanitary Sewer Bypass Pumping	1	LS	$ 30,000.00	$ 30,000.00
2.9	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 5,000.00	$ 5,000.00
2.10	Sub-grade Preparation- 150mm Depth	1,800	m^2	$ 4.00	$ 7,200.00
2.11	Supply and Install Granular Sub-base- 150mm Compacted Depth	1,800	m^2	$ 9.00	$ 16,200.00
2.12	Supply and Install Granular Base- 75mm Compacted Depth	1,800	m^2	$ 8.00	$ 14,400.00
2.13	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	1,800	m^2	$ 25.00	$ 45,000.00
2.14	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	1,800	m^2	$ 20.00	$ 36,000.00
2.15	Adjustment of Appurtensces:				
	(a) Manhole	5	each	$ 500.00	$ 2,500.00
	(b) Valve	3	each	$ 500.00	$ 1,500.00
		SUBTOTAL			$ 345,000.00
		GRAND SUBTOTAL			**$ 385,000.00**
TOTAL CONTINGENCY (30%)					$ 116,000.00
TOTAL ENGINEERING (15%)					$ 75,000.00
		GRAND TOTAL			**$ 576,000.00**

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate - Area 3

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 110,000.00	$ 110,000.00
2	Traffic Accomodation/ Detour	1	LS	$ 30,000.00	$ 30,000.00
		SUBTOTAL			$ 140,000.00
Area 3					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	210	m	$ 20.00	$ 4,200.00
2.2	Remove and Dispose of Existing Sanitary Sewer, 250mm	230	m	$ 30.00	$ 6,900.00
2.3	Remove and Dispose of Existing Sanitary Sewer, 300mm	190	m	$ 35.00	$ 6,650.00
2.4	Remove and Dispose of Existing Sanitary Manhole	12	each	$ 600.00	$ 7,200.00
2.5	Supply and Install Sanitary Sewer, 200mm PVC	0	m	$ 350.00	$ -
2.6	Supply and Install Sanitary Sewer, 250mm PVC	440	m	$ 375.00	$ 165,000.00
2.7	Supply and Install Sanitary Sewer, 375mm PVC	190	m	$ 425.00	$ 80,750.00
2.8	Supply and Install Sanitary Sewer Manhole	12	each	$ 10,000.00	$ 120,000.00
2.9	Tie to Existing Sanitary Sewer, 200mm	4	each	$ 2,500.00	$ 10,000.00
2.10	Tie to Existing Sanitary Sewer, 250mm	2	each	$ 2,750.00	$ 5,500.00
2.11	Tie to Existing Sanitary Sewer, 300mm	1	each	$ 3,000.00	$ 3,000.00
2.12	Tie to Existing Sanitary Sewer Lateral	72	each	$ 750.00	$ 54,000.00
2.13	Sanitary Sewer Bypass Pumping	1	LS	$ 60,000.00	$ 60,000.00
2.14	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 10,000.00	$ 10,000.00
2.15	Sub-grade Preparation- 150mm Depth	7,500	m^2	$ 4.00	$ 30,000.00
2.16	Supply and Install Granular Sub-base- 150mm Compacted Depth	7,500	m^2	$ 9.00	$ 67,500.00
2.17	Supply and Install Granular Base- 75mm Compacted Depth	7,500	m^2	$ 8.00	$ 60,000.00
2.18	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	7,500	m^2	$ 25.00	$ 187,500.00
2.19	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	7,500	m^2	$ 20.00	$ 150,000.00
2.20	Adjustment of Appurtensces:				
	(a) Manhole	12	each	$ 500.00	$ 6,000.00
	(b) Valve	9	each	$ 500.00	$ 4,500.00
		SUBTOTAL			$ 1,039,000.00
		GRAND SUBTOTAL			**$ 1,179,000.00**
TOTAL CONTINGENCY (30%)					$ 354,000.00
TOTAL ENGINEERING (15%)					$ 230,000.00
		GRAND TOTAL			**$ 1,763,000.00**

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate - Area 4

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 50,000.00	$ 50,000.00
2	Traffic Accomodation/ Detour	1	LS	$ 25,000.00	$ 25,000.00
		SUBTOTAL			$ 75,000.00
Area 4					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	214	m	$ 20.00	$ 4,280.00
2.2	Remove and Dispose of Existing Sanitary Sewer, 250mm	99	m	$ 30.00	$ 2,970.00
2.3	Remove and Dispose of Existing Sanitary Manhole	12	each	$ 600.00	$ 7,200.00
2.4	Supply and Install Sanitary Sewer, 200mm PVC	0	m	$ 350.00	$ -
2.5	Supply and Install Sanitary Sewer, 250mm PVC	313	m	$ 375.00	$ 117,375.00
2.6	Supply and Install Sanitary Sewer Manhole	5	each	$ 10,000.00	$ 50,000.00
2.7	Tie to Existing Sanitary Sewer, 200mm	6	each	$ 2,500.00	$ 15,000.00
2.8	Tie to Existing Sanitary Sewer Lateral	36	each	$ 750.00	$ 27,000.00
2.9	Sanitary Sewer Bypass Pumping	1	LS	$ 30,000.00	$ 30,000.00
2.10	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 5,000.00	$ 5,000.00
2.11	Sub-grade Preparation- 150mm Depth	4,700	m^2	$ 4.00	$ 18,800.00
2.12	Supply and Install Granular Sub-base- 150mm Compacted Depth	4,700	m^2	$ 9.00	$ 42,300.00
2.13	Supply and Install Granular Base- 75mm Compacted Depth	4,700	m^2	$ 8.00	$ 37,600.00
2.14	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	4,700	m^2	$ 25.00	$ 117,500.00
2.15	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	4,700	m^2	$ 20.00	$ 94,000.00
2.16	Adjustment of Appurtensces:				
	(a) Manhole	5	each	$ 500.00	$ 2,500.00
	(b) Valve	4	each	$ 500.00	$ 2,000.00
		SUBTOTAL			$ 574,000.00
		GRAND SUBTOTAL			**$ 649,000.00**
TOTAL CONTINGENCY (30%)					$ 195,000.00
TOTAL ENGINEERING (15%)					$ 127,000.00
		GRAND TOTAL			**$ 971,000.00**

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate - Area 5

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$180,000.00	$ 180,000.00
2	Traffic Accomodation/ Detour	1	LS	$ 50,000.00	$ 50,000.00
		SUBTOTAL			$ 230,000.00
Area 5					
2.1	Remove and Dispose of Existing Sanitary Sewer, 300mm	112	m	$ 20.00	$ 2,240.00
2.2	Remove and Dispose of Existing Sanitary Sewer, 375mm	1,022	m	$ 35.00	$ 35,770.00
2.3	Remove and Dispose of Existing Sanitary Sewer, 450mm	1,270	m	$ 40.00	$ 50,800.00
2.4	Remove and Dispose of Existing Sanitary Manhole	26	each	$ 600.00	$ 15,600.00
2.5a	Supply and Install Sanitary Sewer,525 mm PVC	200	each.	$ 750.00	$ 150,000.00
2.5b	Supply and Install Sanitary Sewer, 600mm PVC	2,200	m	$ 800.00	$ 1,760,000.00
2.6	Supply and Install Sanitary Sewer Manhole	26	each	$ 10,000.00	$ 260,000.00
2.7	Tie to Existing Sanitary Sewer, 200mm	16	each	$ 2,500.00	$ 40,000.00
2.8	Tie to Existing Sanitary Sewer, 300mm	2	each	$ 3,000.00	$ 6,000.00
2.9	Tie to Existing Sanitary Sewer, 375mm	1	each	$ 3,500.00	$ 3,500.00
2.10	Tie to Existing Sanitary Sewer Lateral	4	each	$ 750.00	$ 3,000.00
2.11	Sanitary Sewer Bypass Pumping	1	LS	$450,000.00	$ 450,000.00
2.12	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 15,000.00	$ 15,000.00
2.13	Sub-grade Preparation- 150mm Depth	30,000	m^2	$ 4.00	$ 120,000.00
2.14	Supply and Install Granular Sub-base- 150mm Compacted Depth	30,000	m^2	$ 9.00	$ 270,000.00
2.15	Supply and Install Granular Base- 75mm Compacted Depth	30,000	m^2	$ 8.00	$ 240,000.00
2.16	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	30,000	m^2	$ 25.00	$ 750,000.00
2.17	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	30,000	m^2	$ 20.00	$ 600,000.00
2.18	Adjustment of Appurtensces:				
	(a) Manhole	26	each	$ 500.00	$ 13,000.00
	(b) Valve	24	each	$ 500.00	$ 12,000.00
		SUBTOTAL			$ 4,797,000.00
		GRAND SUBTOTAL			**$ 5,027,000.00**
TOTAL CONTINGENCY (30%)					$ 1,508,000.00
TOTAL ENGINEERING (15%)					$ 980,000.00
		GRAND TOTAL			**$ 7,515,000.00**

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate- North Industrial Future Upgrades

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 180,000.00	$ 180,000.00
2	Traffic Accomodation/ Detour	1	LS	$ 80,000.00	$ 80,000.00
		SUBTOTAL			$ 260,000.00
Area 6					
2.1	Remove and Dispose of Existing Sanitary Sewer, 300mm	1,064	m	$ 20.00	$ 21,280.00
2.2	Remove and Dispose of Existing Sanitary Sewer, 375mm	451	m	$ 35.00	$ 15,785.00
2.3	Remove and Dispose of Existing Sanitary Manhole	16	each	$ 600.00	$ 9,600.00
2.4	Supply and Install Sanitary Sewer, 600mm PVC	945	m	$ 800.00	$ 756,000.00
2.5	Supply and Install Sanitary Sewer, 750mm PVC	570	m	$ 900.00	$ 513,000.00
2.6	Supply and Install Sanitary Sewer Manhole	16	each	$ 10,000.00	$ 160,000.00
2.7	Tie to Existing sanitary Sewer, 200mm	3	each	$ 2,500.00	$ 7,500.00
2.8	Tie to Existing Sanitary Sewer, 300mm	2	each	$ 3,000.00	$ 6,000.00
2.9	Tie to Existing Sanitary Sewer, 375mm	2	each	$ 3,500.00	$ 7,000.00
2.10	Sanitary Sewer Bypass Pumping	1	LS	$ 100,000.00	$ 100,000.00
2.11	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 15,000.00	$ 15,000.00
2.12	Auger Bore Highway and CPR Cased Crossing	1	LS	$ 400,000.00	$ 400,000.00
2.12	Sub-grade Preparation- 150mm Depth	14,100	m^2	$ 4.00	$ 56,400.00
2.13	Supply and Install Granular Sub-base- 150mm Compacted Depth	14,100	m^2	$ 9.00	$ 126,900.00
2.14	Supply and Install Granular Base- 75mm Compacted Depth	14,100	m^2	$ 8.00	$ 112,800.00
2.15	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	14,100	m^2	$ 25.00	$ 352,500.00
2.16	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	14,100	m^2	$ 20.00	$ 282,000.00
2.17	Adjustment of Appurtensces:				
	(a) Manhole	16	each	$ 500.00	$ 8,000.00
	(b) Valve	13	each	$ 500.00	$ 6,500.00
		SUBTOTAL			$ 2,956,000.00
		GRAND SUBTOTAL			**$ 3,216,000.00**
TOTAL CONTINGENCY (30%)					$ 965,000.00
TOTAL ENGINEERING (15%)					$ 627,000.00
		GRAND TOTAL			**$ 4,808,000.00**

TOWN OF REDCLIFF - WASTEWATER SYSTEM EVALUATION

Conceptual Cost Estimate - NW Future Upgrades

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$100,000.00	$ 100,000.00
2	Traffic Accomodation/ Detour	1	LS	$ 75,000.00	$ 75,000.00
		SUBTOTAL			$ 175,000.00
Area 7					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	900	m	$ 20.00	$ 18,000.00
2.2	Remove and Dispose of Existing Sanitary Manhole	12	each	$ 600.00	$ 7,200.00
2.3	Supply and Install Sanitary Sewer, 300mm PVC	990	m	$ 400.00	$ 396,000.00
	Supply and Install Sanitary Sewer, 450 mm PVC	480	m	$ 450.00	$ 216,000.00
2.4	Supply and Install Sanitary Sewer Manhole	20	each	$ 10,000.00	$ 200,000.00
2.5	Tie to Existing Sanitary Sewer, 200mm	15	each	$ 2,500.00	$ 37,500.00
2.6	Sanitary Sewer Bypass Pumping	1	LS	$ 30,000.00	$ 30,000.00
2.7	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 7,500.00	$ 7,500.00
2.8	Sub-grade Preparation- 150mm Depth	15,000	m^2	$ 4.00	$ 60,000.00
2.9	Supply and Install Granular Sub-base- 150mm Compacted Depth	15,000	m^2	$ 9.00	$ 135,000.00
2.10	Supply and Install Granular Base- 75mm Compacted Depth	15,000	m^2	$ 8.00	$ 120,000.00
2.11	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	15,000	m^2	$ 25.00	$ 375,000.00
2.12	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	15,000	m^2	$ 20.00	$ 300,000.00
2.13	Adjustment of Appurtensces:				
	(a) Manhole	12	each	$ 500.00	$ 6,000.00
	(b) Valve	8	each	$ 500.00	$ 4,000.00
		SUBTOTAL			$ 1,912,000.00
		GRAND SUBTOTAL			**$ 2,087,000.00**
TOTAL CONTINGENCY (30%)					$ 626,000.00
TOTAL ENGINEERING (15%)					$ 407,000.00
		GRAND TOTAL			**$ 3,120,000.00**

REDCLIFF WASTEWATER EVALUATION

Conceptual Cost Estimate- Local Residential

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$20,000.00	$ 20,000.00
2	Traffic Accommodation/ Detour	1	LS	$10,000.00	$ 10,000.00
		SUBTOTAL			$ 30,000.00
Local Residential					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	120	m	$ 20.00	$ 2,400.00
2.2	Remove and Dispose of Existing Sanitary Manhole	2	each	$ 600.00	$ 1,200.00
2.3	Supply and Install Sanitary Sewer, 200mm PVC	120	m	$ 350.00	$ 42,000.00
2.4	Supply and Install Sanitary Sewer Manhole	2	each	$10,000.00	$ 20,000.00
2.5	Tie to Existing Sanitary Sewer, 200mm	2	each	$ 2,500.00	$ 5,000.00
2.6	Sanitary Sewer Bypass Pumping	1	LS	$10,000.00	$ 10,000.00
2.7	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 2,000.00	$ 2,000.00
2.8	Sanitary Sewer Service Replacement to Property	18	LS	$ 3,000.00	$ 54,000.00
2.9	Saw Cut Remove, and Dispose of Monolithic Concrete	108	m	$ 40.00	$ 4,320.00
2.10	Supply, Install Monolithic Sidewalk	108	m	$ 200.00	$ 21,600.00
2.11	Remove, Dispose and Replace Sod c/w Topsoil Salvage	432	m^2	$ 100.00	$ 43,200.00
2.12	Sub-grade Preparation- 150mm Depth	1,260	m^2	$ 4.00	$ 5,040.00
2.13	Supply and Install Granular Sub-base- 150mm Compacted Depth	1,260	m^2	$ 9.00	$ 11,340.00
2.14	Supply and Install Granular Base- 75mm Compacted Depth	1,260	m^2	$ 8.00	$ 10,080.00
2.15	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	1,260	m^2	$ 25.00	$ 31,500.00
2.16	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	1,260	m^2	$ 20.00	$ 25,200.00
	Adjustment of Appurtenances:				
	(a) Manhole	2	each	$ 500.00	$ 1,000.00
	(b) Valve	2	each	$ 500.00	$ 1,000.00
2.17	Hydrovac Program	1	LS	$ 2,800.00	$ 2,800.00
		SUBTOTAL			$ 294,000.00
		GRAND SUBTOTAL			**$ 324,000.00**
TOTAL CONTINGENCY (20%)					$ 65,000.00
TOTAL ENGINEERING (15%)					$ 58,000.00
		GRAND TOTAL			**$ 447,000.00**

$ 3,700.00 per lineal meter

***Assumptions
* 200mm Sanitary PVC
* 120m average length per block
* 2 MH's per block
* 18 Services average per block
*10.5m wide road
*Monolithic Sidewalk for Service replacement, 6m per service
*Hydrovac based on 8 hours @ $350/hr

REDCLIFF WASTEWATER EVALUATION

Conceptual Cost Estimate- Typical Collector

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 20,000.00	$ 20,000.00
2	Traffic Accommodation/ Detour	1	LS	$ 20,000.00	$ 20,000.00
		SUBTOTAL			$ 40,000.00
Collector					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	120	m	$ 20.00	$ 2,400.00
2.2	Remove and Dispose of Existing Sanitary Manhole	2	each	$ 600.00	$ 1,200.00
2.3	Supply and Install Sanitary Sewer, 200mm PVC	120	m	$ 350.00	$ 42,000.00
2.4	Supply and Install Sanitary Sewer Manhole	2	each	$ 10,000.00	$ 20,000.00
2.5	Tie to Existing Sanitary Sewer, 200mm	2	each	$ 2,500.00	$ 5,000.00
2.6	Sanitary Sewer Bypass Pumping	1	LS	$ 10,000.00	$ 10,000.00
2.7	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 2,000.00	$ 2,000.00
2.8	Sanitary Sewer Service Replacement to Property	18	LS	$ 3,000.00	$ 54,000.00
2.9	Saw Cut Remove, and Dispose of Monolithic Concrete	108	m	$ 40.00	$ 4,320.00
2.10	Supply, Install Monolithic Sidewalk	108	m	$ 200.00	$ 21,600.00
2.11	Remove, Dispose and Replace Sod c/w Topsoil Salvage	432	m^2	$ 100.00	$ 43,200.00
2.12	Sub-grade Preparation- 150mm Depth	1,440	m^2	$ 4.00	$ 5,760.00
2.13	Supply and Install Granular Sub-base- 150mm Compacted Depth	1,440	m^2	$ 9.00	$ 12,960.00
2.14	Supply and Install Granular Base- 75mm Compacted Depth	1,440	m^2	$ 8.00	$ 11,520.00
2.15	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	1,440	m^2	$ 25.00	$ 36,000.00
2.16	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	1,440	m^2	$ 20.00	$ 28,800.00
	Adjustment of Appurtenances:				
	(a) Manhole	2	each	$ 500.00	$ 1,000.00
	(b) Valve	2	each	$ 500.00	$ 1,000.00
2.17	Hydrovac Program	1	LS	$ 2,800.00	$ 2,800.00
		SUBTOTAL			$ 306,000.00
		GRAND SUBTOTAL			**$ 346,000.00**
TOTAL CONTINGENCY (20%)					$ 69,000.00
TOTAL ENGINEERING (15%)					$ 62,000.00
		GRAND TOTAL			**$ 477,000.00**

$ 4,000.00 per lineal meter

***Assumptions
* 200mm Sanitary PVC
* 120m average length per block
* 2 MH's per block
* 18 Services average per block
*12m wide road
*Monolithic Sidewalk for Service replacement, 6m per service
*Hydrovac based on 8 hours @ $350/hr

REDCLIFF WASTEWATER EVALUATION

Conceptual Cost Estimate- Typical Undivided Major

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization/ Demobilization	1	LS	$ 20,000.00	$ 20,000.00
2	Traffic Accommodation/ Detour	1	LS	$ 50,000.00	$ 50,000.00
		SUBTOTAL			$ 70,000.00
Undivided Major					
2.1	Remove and Dispose of Existing Sanitary Sewer, 200mm	120	m	$ 20.00	$ 2,400.00
2.2	Remove and Dispose of Existing Sanitary Manhole	2	each	$ 600.00	$ 1,200.00
2.3	Supply and Install Sanitary Sewer, 200mm PVC	120	m	$ 350.00	$ 42,000.00
2.4	Supply and Install Sanitary Sewer Manhole	2	each	$ 10,000.00	$ 20,000.00
2.5	Tie to Existing Sanitary Sewer, 200mm	2	each	$ 2,500.00	$ 5,000.00
2.6	Sanitary Sewer Bypass Pumping	1	LS	$ 10,000.00	$ 10,000.00
2.7	CCTV Inspection of New Sanitary Sewer Main	1	LS	$ 2,000.00	$ 2,000.00
2.8	Sanitary Sewer Service Replacement	18	LS	$ 3,000.00	$ 54,000.00
2.9	Saw Cut Remove, and Dispose of Monolithic Concrete	108	m	$ 40.00	$ 4,320.00
2.10	Supply, Install Monolithic Sidewalk	108	m	$ 200.00	$ 21,600.00
2.11	Remove, Dispose and Replace Sod c/w Topsoil Salvage	432	m^2	$ 100.00	$ 43,200.00
2.12	Sub-grade Preparation- 150mm Depth	1,776	m^2	$ 4.00	$ 7,104.00
2.13	Supply and Install Granular Sub-base- 150mm Compacted Depth	1,776	m^2	$ 9.00	$ 15,984.00
2.14	Supply and Install Granular Base- 75mm Compacted Depth	1,776	m^2	$ 8.00	$ 14,208.00
2.15	Supply and Install Asphalt Mix Type B1- 75mm Compacted Depth	1,776	m^2	$ 25.00	$ 44,400.00
2.16	Supply and Install Asphalt Mix Type S2- 50mm Compacted Depth	1,776	m^2	$ 20.00	$ 35,520.00
	Adjustment of Appurtenances:				
	(a) Manhole	2	each	$ 500.00	$ 1,000.00
	(b) Valve	2	each	$ 500.00	$ 1,000.00
2.17	Hydrovac Program	1	LS	$ 2,800.00	$ 2,800.00
		SUBTOTAL			$ 328,000.00
		GRAND SUBTOTAL			**$ 398,000.00**
TOTAL CONTINGENCY (20%)					$ 80,000.00
TOTAL ENGINEERING (15%)					$ 72,000.00
		GRAND TOTAL			**$ 550,000.00**

$ 4,600.00 per lineal meter

***Assumptions
* 200mm Sanitary PVC
* 120m average length per block
* 2 MH's per block
* 18 Services average per block
*14.8m wide road
*Hydrovac based on 8 hours @ $350/hr

APPENDIX E

Lift Station Data

3rd Avenue NW Lift Station
March 18, 2013
Measured By: Cody Hyam

Start Depth:	9.51	m
Stop Depth:	10.80	m
Difference:	1.29	m
Vault Inside Area:	7.300	m^2 (3.049 m diameter)
VOLUME:	9.417	m3
V=	9417	L

FIELD DATA							Time Off	Time On	Incoming Flow	Pump Down Flow	Pump Output Flow
Pump #	Time	ON			OFF		t_1	t_2	$Q_1 = V/t_1$	$Q_2 = V/t_2$	$Q_{PUMP} = Q_1 + Q_2$
		min	sec		min	sec	(s)	(s)	(L/s)	(L/s)	(L/s)
1		0	0		41	54	2514	-	-	-	-
2		3	50		41	54	2514	230	3.75	40.94	44.69
1		3	51		41	54	2514	231	3.75	40.77	44.51
2		3	48		41	54	2514	228	3.75	41.30	45.05
1		3	59		41	54	2514	239	3.75	39.40	41.27

OVERALL AVERAGE (L/s):	43.88
AVERAGE PUMP 1 (L/s):	42.89
AVERAGE PUMP 2 (L/s):	44.87

FACTORY LIFT STATION
March 18, 2013
Measured By: Cody Hyam

Start Depth:	6.60	m
Stop Depth:	6.90	m
Difference:	0.30	m
Vault Inside Area:	8.290	m^2 (2.46 x 3.37 m^2)
VOLUME:	2.487	m3
V=	2487	L

FIELD DATA						Time Off	Time On	Incoming Flow	Pump Down Flow	Pump Output Flow
Pump #	Time	ON		OFF		t_1	t_2	$Q_1 = V/t_1$	$Q_2 = V/t_2$	$Q_{PUMP} = Q_1 + Q_2$
		min	sec	min	sec	(s)	(s)	(L/s)	(L/s)	(L/s)
		0	0	0	0	0	-	-	-	-
2		3	13	6	25	385	193	6.46	12.89	18.60
1		3	18	8	20	500	198	4.97	12.56	17.80
2		3	15	7	31	451	195	5.51	12.75	17.82
1		3	27	8	59	539	207	4.61	12.01	14.32

OVERALL AVERAGE (L/s):	17.14
AVERAGE PUMP 1 (L/s):	16.06
AVERAGE PUMP 2 (L/s):	18.21

on site flowmeter suggested the same flow as measured

REDCLIFF WAY (KIPLING) LIFT STATION
March 18, 2013
Measured By: Cody Hyam

Start Depth:	5.35	m
Stop Depth:	6.90	m
Difference:	1.55	m
Vault Inside Area:	2.540	m^2 (supplied by Town)
VOLUME:	3.937	m3
V=	3937	L

FIELD DATA						Time Off	Time On	Incoming Flow	Pump Down Flow	Pump Output Flow
Pump #	Time	ON		OFF		t_1	t_2	$Q_1 = V/t_1$	$Q_2 = V/t_2$	$Q_{PUMP} = Q_1 + Q_2$
		min	sec	min	sec	(s)	(s)	(L/s)	(L/s)	(L/s)
		0	0	0	0	0	-	-	-	-
1		5	29	12	41	761	329	5.17	11.97	17.14
2		6	16	12	42	762	376	5.17	10.47	15.42
1		5	10	13	53	833	310	4.73	12.70	17.32
2		6	17	14	34	874	377	4.50	10.44	12.70

OVERALL AVERAGE (L/s):	15.64
AVERAGE PUMP 1 (L/s):	14.06
AVERAGE PUMP 2 (L/s):	17.23

JESMOND LIFT STATION
March 19, 2013
Measured By: Cody Hyam

Start Depth:	4.42	m
Stop Depth:	4.96	m
Difference:	0.54	m
Vault Inside Area:	3.580	m^2 (supplied by Town)
VOLUME:	1.933	m3
V=	1933	L

FIELD DATA						Time Off	Time On	Incoming Flow	Pump Down Flow	Pump Output Flow
Pump #	**Time**	**ON**		**OFF**		t_1	t_2	$Q_1 = V/t_1$	$Q_2 = V/t_2$	$Q_{PUMP} = Q_1 + Q_2$
		min	**sec**	**min**	**sec**	**(s)**	**(s)**	**(L/s)**	**(L/s)**	**(L/s)**
		0	0	0	0	0	-	-	-	-
1		2	53.2	6	40	400	173.2	4.83	11.16	15.99
2		2	53.5	6	40	400	173.5	4.83	11.14	15.89
1		2	53.6	6	55	415	173.6	4.66	11.14	15.78
2		2	52.9	6	58	418	172.9	4.62	11.18	13.49

OVERALL AVERAGE (L/s):	15.29
AVERAGE PUMP 1 (L/s):	14.69
AVERAGE PUMP 2 (L/s):	15.89

SEMRAU LIFT STATION (BIG EAGLE)
March 19, 2013
Measured By: Cody Hyam

Start Depth:	4.42	m
Stop Depth:	4.96	m
Difference:	0.54	m
Vault Inside Area:	3.240	m^2 (supplied by Town)
VOLUME:	1.750	m3
V=	1750	L

FIELD DATA						Time Off	Time On	Incoming Flow	Pump Down Flow	Pump Output Flow
Pump #	**Time**	**ON**		**OFF**		t_1	t_2	$Q_1 = V/t_1$	$Q_2 = V/t_2$	$Q_{PUMP} = Q_1 + Q_2$
		min	**sec**	**min**	**sec**	**(s)**	**(s)**	**(L/s)**	**(L/s)**	**(L/s)**
		0	0	-	-	-	-	-	-	-
1		5	59	-	-	-	359	0.00	4.87	4.87
2		6	16	-	-	-	376	0.00	4.65	4.65
1		6	2	-	-	-	362	0.00	4.83	4.83
2		5	34	-	-	-	334	0.00	5.24	5.24

OVERALL AVERAGE (L/s):	4.90
AVERAGE PUMP 1 (L/s):	4.95
AVERAGE PUMP 2 (L/s):	4.85

Incoming flow was created using a flush truck to expedite the metering process. Incoming flow was determined by Town of Redcliff Staff and on-site MPE representative, to be insignificant regarding the testing process.

FLYGT	PERFORMANCE CURVE	PRODUCT NP3127.181	TYPE HT
DATE 2011-08-12	PROJECT REDCLIFF #1 UPGRADE	CURVE NO 63-489-00-2202	ISSUE 4

	1/1-LOAD	3/4-LOAD	1/2-LOAD
MOTOR COS PHI	0.88	0.85	0.78
MOTOR EFFICIENCY	84.5 %	85.5 %	84.5 %
GEAR EFFICIENCY	---	---	---

MOTOR SHAFT POWER	10	hp
STARTING CURRENT ...	169	A
RATED CURRENT ...	28	A
RATED SPEED	1740	rpm
TOT.MOM.OF INERTIA ...	0.050	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER 195 mm

MOTORTYPE	STATOR	REV
21-12-4AL	28D	11

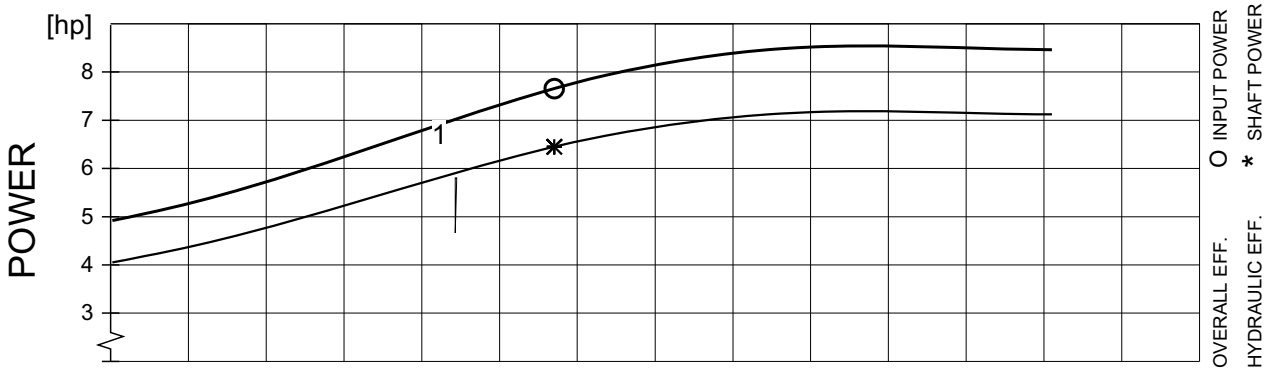
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	208 V	4

GEARTYPE	RATIO
---	---

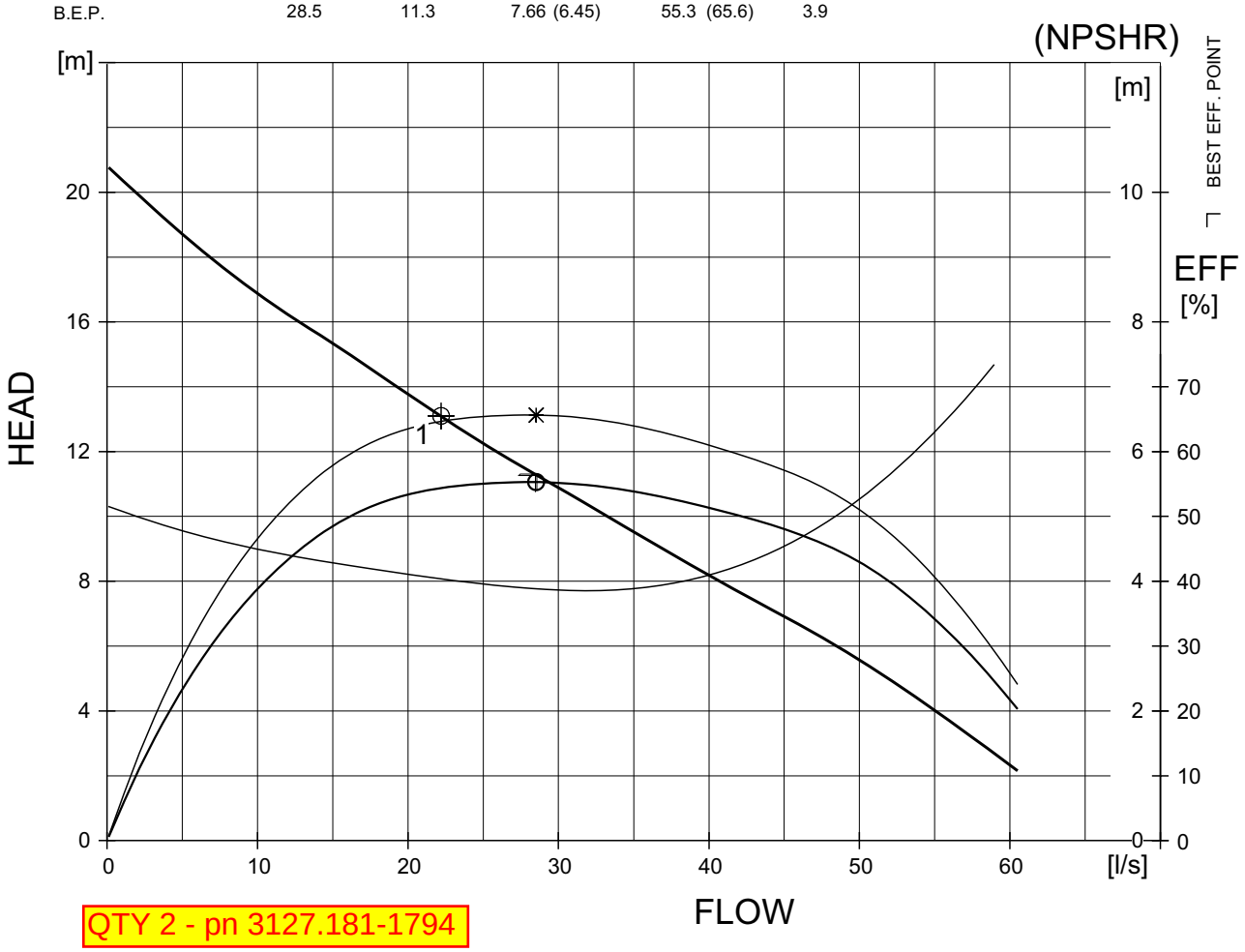
COMMENTS

INLET/OUTLET -/100 mm

IMP. THROUGHLET ---



DUTY-POINT	FLOW [l/s]	HEAD [m]	POWER [hp]	EFF [%]	(NPSHR)[m]
1	22.2	13.1	7.01 (5.91)	54.4 (64.7)	4.0
B.E.P.	28.5	11.3	7.66 (6.45)	55.3 (65.6)	3.9



QTY 2 - pn 3127.181-1794

(NPSHR) = (NPSH3) + margins

Performance with clear water and rating data at 40 °C

FLYGT CURVE

FLYPS3.1.6.6 (20090313)

PERFORMANCE CURVE

PRODUCT	TYPE
NP3127.180	HT

DATE	PROJECT	CURVE NO	ISSUE
2002-09-04		63-488-00-3755	1

	1/1-LOAD	3/4-LOAD	1/2-LOAD
MOTOR COS PHI	0.88	0.86	0.79
MOTOR EFFICIENCY	84.0 %	85.0 %	84.5 %
GEAR EFFICIENCY	---	---	---

MOTOR SHAFT POWER	7.5	kW
STARTING CURRENT ...	55	A
RATED CURRENT ...	9.7	A
RATED SPEED	1735	rpm
TOT.MOM.OF INERTIA ...	0.054	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER: 215 mm

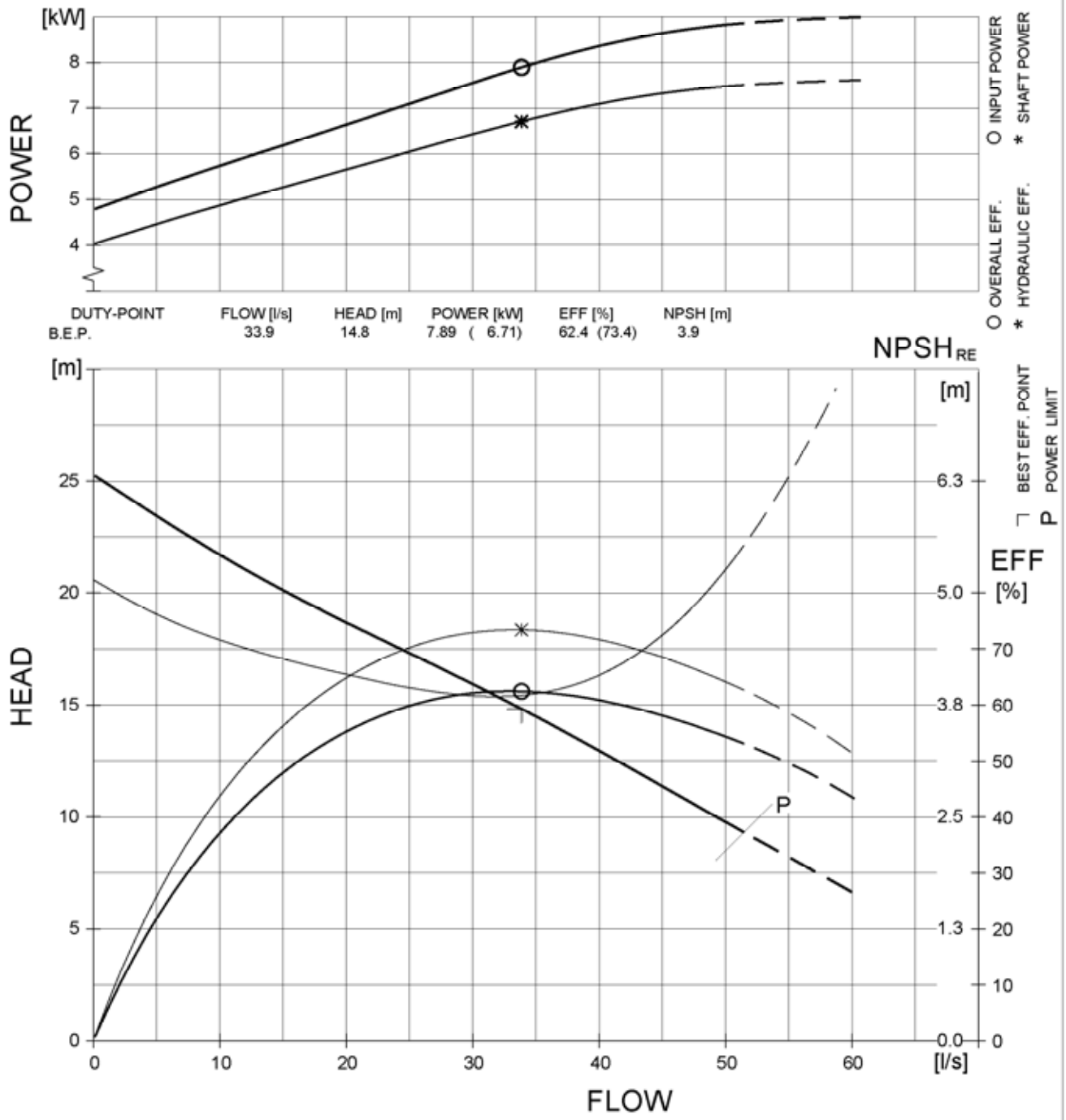
MOTORTYPE	STATOR	REV
21-12-4AL	52D	10

FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	600 V	4

GEARTYPE	RATIO
---	---

COMMENTS

INLET/OUTLET	IMP. THROUGHLET
- /100 mm	---



DUTY-POINT	FLOW [l/s]	HEAD [m]	POWER [kW]	EFF [%]	NPSH [m]
B.E.P.	33.9	14.8	7.89 (6.71)	62.4 (73.4)	3.9

FLYPS2.12 (20010918)

Performance with clear water and rating data at 40 °C

CURVE

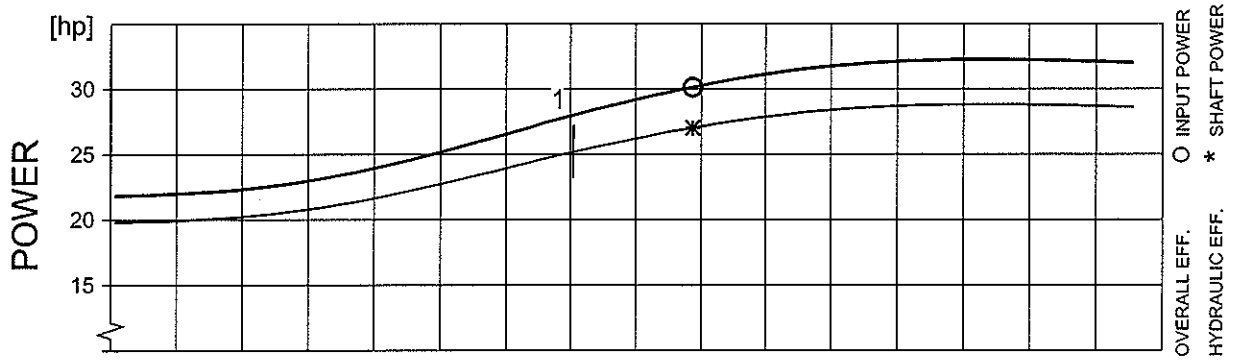
FLYGT	PERFORMANCE CURVE	PRODUCT NP3171.180	TYPE MT
DATE 2003-09-19	PROJECT	CURVE NO 63-434-00-6030	ISSUE 2

	1/1-LOAD	3/4-LOAD	1/2-LOAD
MOTOR COS PHI	0.87	0.83	0.73
MOTOR EFFICIENCY	89.0 %	90.0 %	90.5 %
GEAR EFFICIENCY	---	---	---

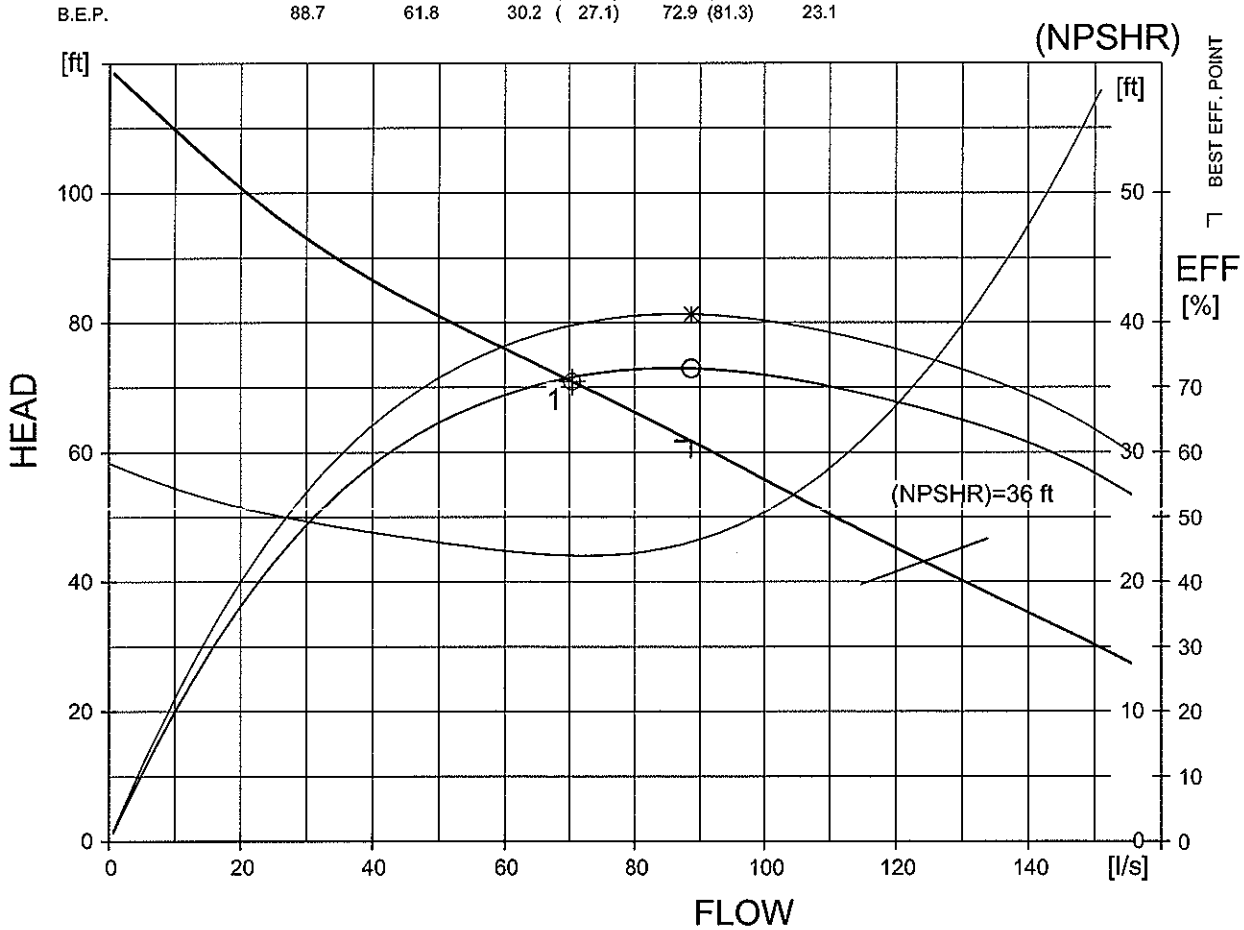
MOTOR SHAFT POWER	30	hp
STARTING CURRENT ...	231	A
RATED CURRENT ...	36	A
RATED SPEED	1755	rpm
TOT.MOM.OF INERTIA ...	0.16	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER		
255 mm		
MOTORTYPE	STATOR	REV
25-17-4AA	01D	10
FREQ. / PHASES	VOLTAGE	POLES
60 Hz / 3	460 V	4
GEARTYPE	RATIO	
---	---	

COMMENTS	INLET/OUTLET	IMP. THROUGHLET
	- /150 mm	---



DUTY-POINT	FLOW [l/s]	HEAD[ft]	POWER [hp]	EFF [%]	(NPSHR)[ft]
1	70.5	70.9	28.1 (25.3)	71.5 (79.5)	22.0
B.E.P.	88.7	61.8	30.2 (27.1)	72.9 (81.3)	23.1



FLYPS2.18 (20021016)

(NPSHR) = (NPSH3) + margins

Performance with clear water and rating data at 40 °C

FLYGT CURVE

PERFORMANCE CURVE

PRODUCT	TYPE
MP3102.170	HT

DATE	PROJECT	CURVE NO	ISSUE
2006-10-03		63-263-00-5260	6

	1/1-LOAD	3/4-LOAD	1/2-LOAD
MOTOR COS PHI	0.93	0.91	0.87
MOTOR EFFICIENCY	80.5 %	80.5 %	78.5 %
GEAR EFFICIENCY	---	---	---

MOTOR SHAFT POWER	6	hp
STARTING CURRENT ...	44	A
RATED CURRENT ...	5.7	A
RATED SPEED	3475	rpm
TOT.MOM.OF INERTIA ...	---	
NO. OF BLADES	6	

IMPELLER DIAMETER: 155 mm

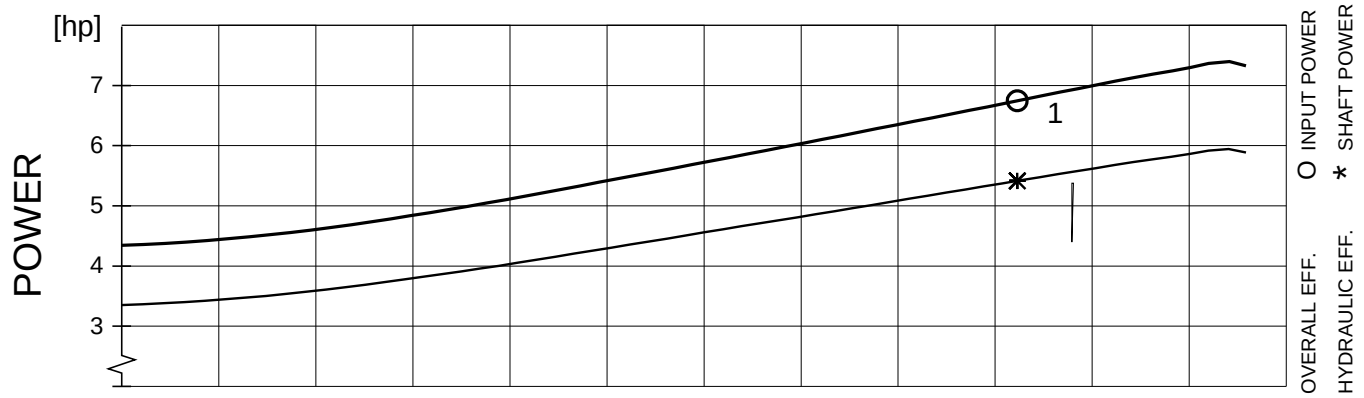
MOTORTYPE	STATOR	REV
18-10-2AL	52D	11

FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	600 V	2

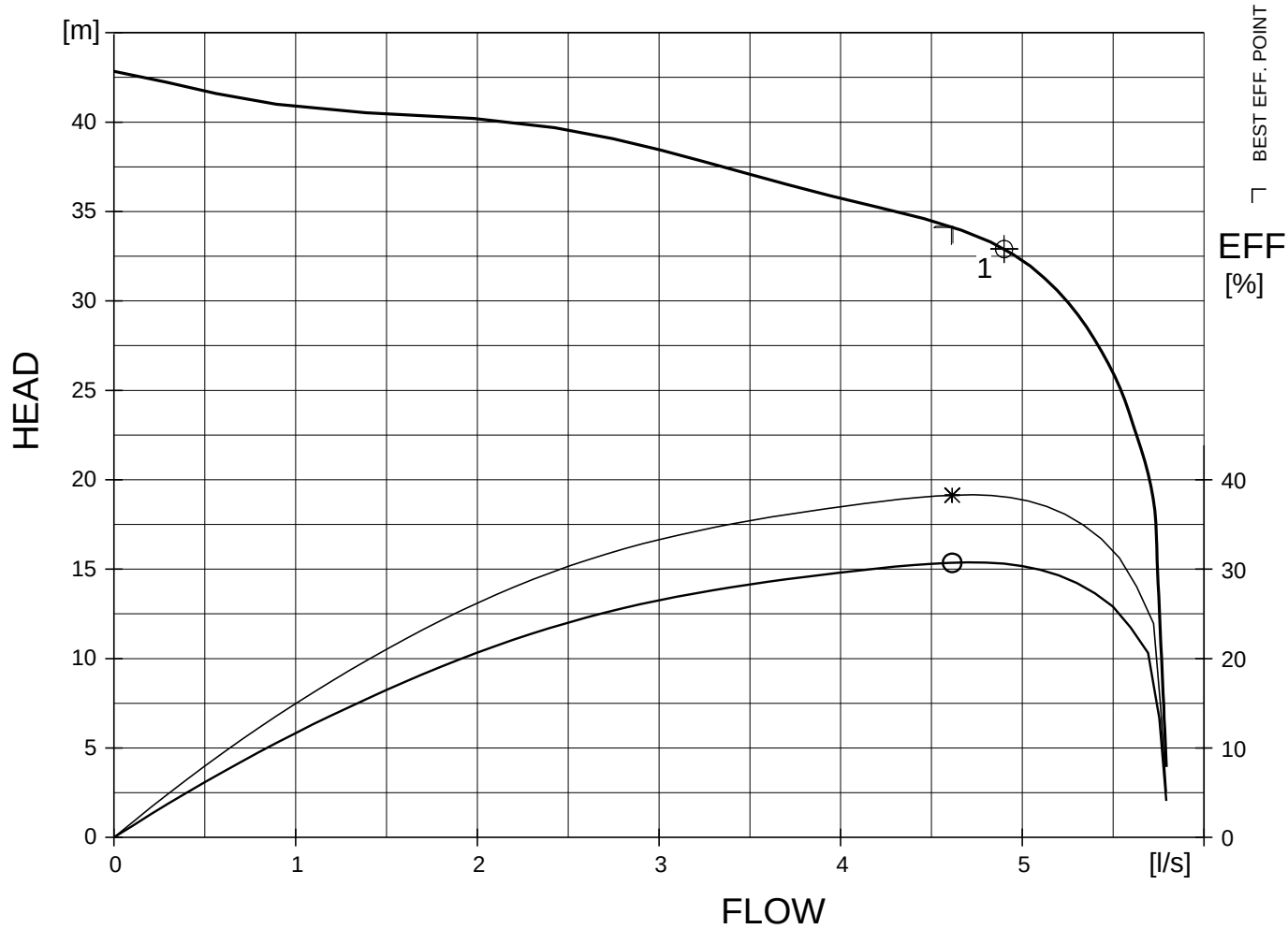
GEARTYPE	RATIO
---	---

COMMENTS

INLET/OUTLET	IMP. THROUGHLET
-/ 40 mm	---



DUTY-POINT	FLOW [l/s]	HEAD [m]	POWER [hp]	EFF [%]	(NPSHR)[m]
1	4.90	32.9	6.91 (5.61)	30.6 (38.1)	
B.E.P.	4.61	34.1	6.75 (5.42)	30.7 (38.3)	



FLYPS3.1.5.7 (20060531)

Performance with clear water and rating data at 40 °C

CURVE

FLYGT	PERFORMANCE CURVE	PRODUCT	TYPE
		NP3127.180	MT

DATE	PROJECT	CURVE NO	ISSUE
2000-03-01		63-439-00-2240	1

	1/1-LOAD	3/4-LOAD	1/2-LOAD
MOTOR COS PHI	0.75	0.67	0.55
MOTOR EFFICIENCY	83.5 %	82.5 %	78.5 %
GEAR EFFICIENCY	---	---	---

MOTOR SHAFT POWER	7.5	Hp
STARTING CURRENT ...	119	A
RATED CURRENT ...	22	A
RATED SPEED	1760	rpm
TOT.MOM.OF INERTIA ...	0.044	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER: 188 mm

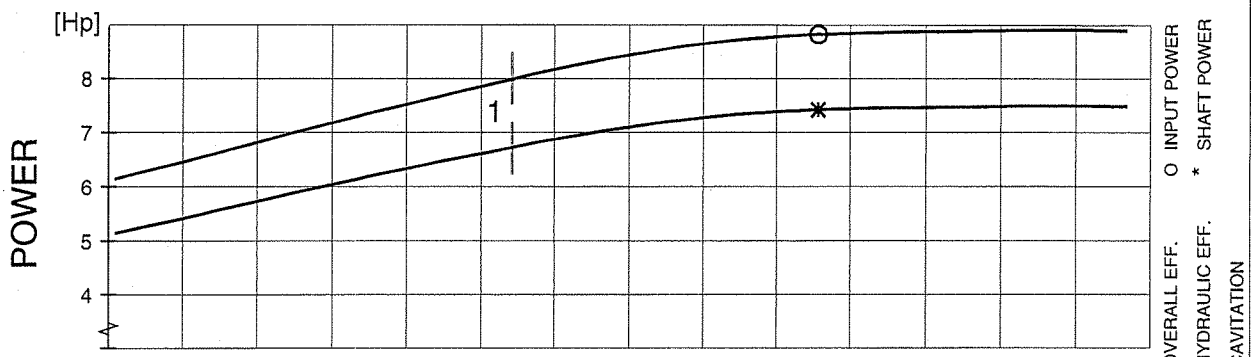
MOTORTYPE	STATOR	REV
21-10-4AL	29D	10

FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	230 V	4

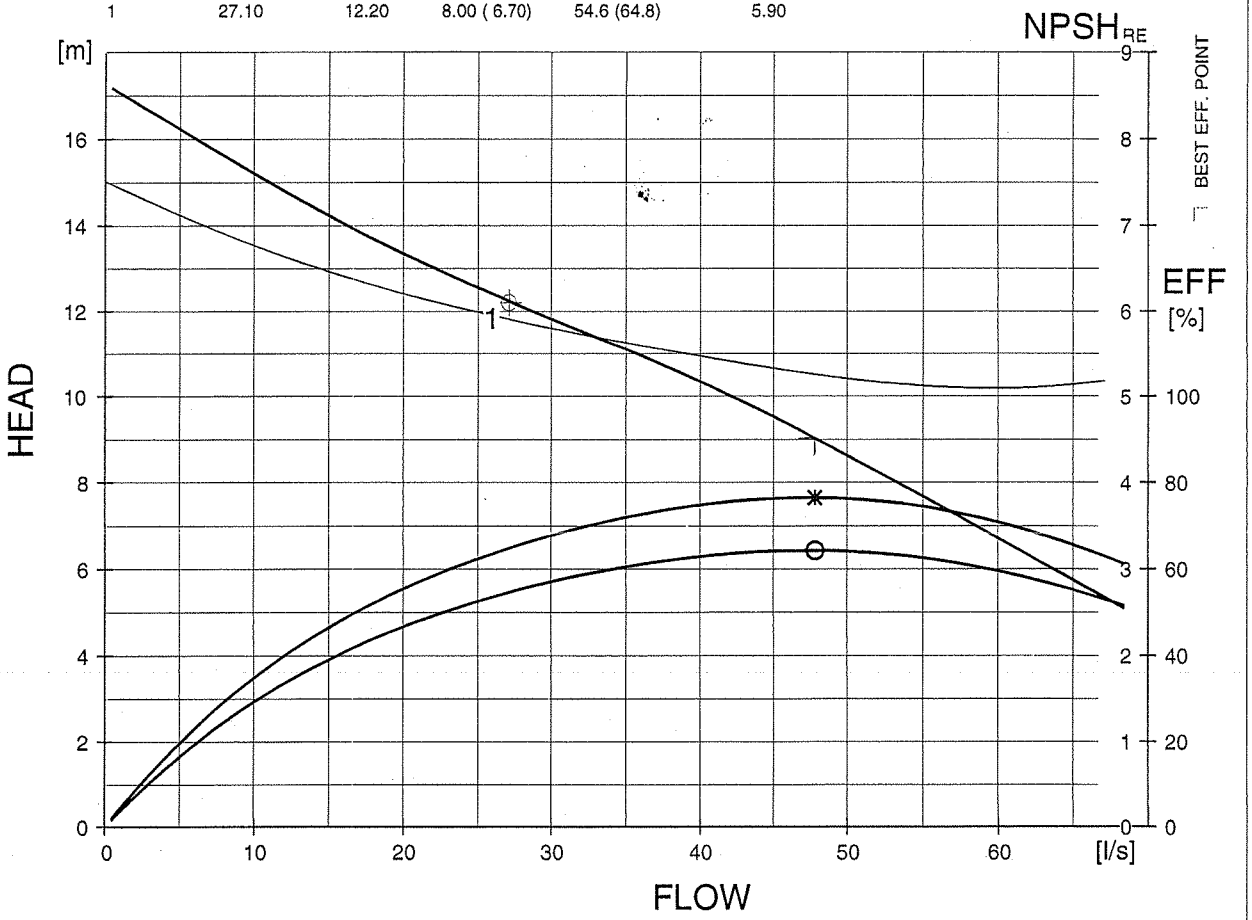
GEARTYPE	RATIO
---	---

COMMENTS

INLET/OUTLET	IMP. THROUGHLET
- /100 mm	---



DUTY-POINT:	FLOW[l/s]	HEAD[m]	POWER[Hp]	EFF[%]	NPSH[m]	GUARANTY
B.E.P.:	47.83	9.02	8.82 (7.42)	64.3 (76.5)	5.26	
1	27.10	12.20	8.00 (6.70)	54.6 (64.8)	5.90	



FLYPS 2.0 (1118)

Performance with clear water and rating data at 40 °C

FLYGT CURVE

Town of Redcliff Wastewater/Sanitary System Evaluation
Lift Station Inspection Check List

Lift Station: 3 St NW
Date: July 18, 2012
By: MPE Engineering Ltd.

File: N\34\00\003\Lift Station Site Review

Present:	Name	Company
	Dean	Town of Redcliff
	Brent Roberston	MPE
	Patrick Boyd	MPE

Pictures: 1272 through 1289

Item		OK	Not OK	Comments/Concerns
Site				
Proximity to Public Facilities or Residences		☑	☐	
360 Access to Wet Well	For Confined Space	☑	☐	
	For Major Maintenance	☑	☐	
360 Access to Building	To Transformer	☑	☐	
	For General Maintenance	☑	☐	
Operator Parking		☑	☐	
Site Security		☑	☐	No Fence, Town reports security not an issue
General Layout	Public Safety	☑	☐	
Electrical	Transformer Secured	☑	☐	
	Transformer Accessible	☑	☐	
Valves	Operable	☐	☐	N/A
	Location/Accessible	☑	☐	In wet well, none on surface

Wet Well General

		OK	Not OK	Comments/Concerns
Wet Well Condition	Benching	☐	☐	N/A, Can't see
	Overflow System	☑	☐	
	No Infiltration	☑	☐	
	Durability Corrosion	☑	☐	
	Inlet and Outlets	☐	☐	Can't See
	Debris	☑	☐	Some debris on mid-floor grating. (backs up past grating in rain events)
Mid-Floor Grating	Secure under load	☑	☐	
	Connection to Concrete	☑	☐	Grating installed too far down in wet well. Does not make it easy for maintenance on lights and air release valve
	Removable	☑	☐	
	No conflict with Pumps	☑	☐	
	Corrosion	☑	☐	
Access/Egress	Lift Davit Socket	☑	☐	
	Size of Opening	☑	☐	
	Ladder Condition	☑	☐	
	Grab Handle upon Entry	☑	☐	
	Top Hatch Secured	☑	☐	
	Top Hatch Operation	☑	☐	
	Access to bottom of Well	☑	☐	
Electrical	Panel Secured	☑	☐	
	Panel Condition	☑	☐	

		OK	Not OK	Comments/Concerns
	Penetrations Sealed	☑	☐	
	Conduits Secured and Sealed	☑	☐	
	Lighting	☑	☐	

HVAC

Ventilation

	Adjustable Speed Blower	☑	☐	3 speeds: Low, Medium, High, Auto. Always on high when entering
	Dexon Condition and Connection	☑	☐	
	Vent piping condition	☑	☐	
	Vent piping secure	☑	☐	
	Wet Well Odor Control	☑	☐	

Item		OK	Not OK	Comments/Concerns
Wet Well Mechanical				
Piping	Secured	☑	☐	Float switches don't use high level. Sticks.
	Corrosion	☑	☐	
Valves	Plug Valves	☑	☐	never turned. Only turned when maintenance on pumps/check valves
Air Release	Piping Secured	☑	☐	
	Connection	☑	☐	replaced recently to plastic model
Pumps	Visual Condition	☐	☐	N/A 30 hp flyght 3171.180-03600
	Accessible (pull pumps)	☑	☐	
	Hoist Equipment	☑	☐	

Generator and Controls Building

Item		OK	Not OK	Comments/Concerns
General Durability	Interior	☐	☐	N/A. Setup not very good
	Exterior	☐	☐	N/A
General Condition	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
	Roof	☐	☐	N/A
	Soffit & Fascia	☐	☐	N/A
	Door & Hardware (Panic)	☐	☐	N/A
	Ceiling	☐	☐	N/A
Forced Air Furnace	Operational	☐	☐	N/A
	Exhaust	☐	☐	N/A
Electrical	Lighting/Receptacles	☑	☐	
	UPS Operational	☑	☐	
	Fire Alarm (911)	☑	☐	
	Security (911)	☑	☐	
	SCADA Compatibility	☑	☐	
	PLC	☐	☐	
	Main Disconnect	☑	☐	
	Transfer Switch	☑	☐	

Item		OK	Not OK	Comments/Concerns
Generator	Genset Exhaust	☐	☐	N/A - Town has one portable generator on trailer that hooks up to lift stations
	Genset Muffler	☐	☐	N/A
	Genset Fuel Filling and Storage	☐	☐	N/A
	Genset Block Heater	☐	☐	N/A
	Genset Battery	☐	☐	N/A
Control Panel	HOA	☑	☐	
	Pump Starters/VFD's	☑	☐	No VFD's
	Hour Meters	☑	☐	
	HMI	☑	☐	
	Autodialer	☑	☐	Sensaphone Autodialer

Misc./Others Built around 2003. Never had problems

General Comments Huge influx of infiltration during rain events. #1 in town for infiltratoin spikes

Town of Redcliff Wastewater/Sanitary System Evaluation
Lift Station Inspection Check List

Lift Station: Factory Lift Station
Date: July 18, 2012
By: MPE Engineering Ltd.

File: N\34\00\003\Lift Station Site Review

Present:	Name	Company
	Dean	Town
	Patrick Boyd	MPE
	Brent Robertson	MPE

Pictures: 1290 through 1304

Item		OK	Not OK	Comments/Concerns
Site				
Proximity to Public Facilities or Residences		☑	☐	
360 Access to Wet Well	For Confined Space	☑	☐	
	For Major Maintenance	☑	☐	
360 Access to Building	To Transformer	☐	☑	Poor access for generator trailer
	For General Maintenance	☑	☐	
Operator Parking		☑	☐	
Site Security		☑	☐	No fence, security not an issue
General Layout	Public Safety	☑	☐	
Electrical	Transformer Secured	☑	☐	
	Transformer Accessible	☑	☐	
Valves	Operable	☐	☐	N/A
	Location/Accessible	☐	☐	N/A

Wet Well General

		OK	Not OK	Comments/Concerns
Wet Well Condition	Benching	☐	☐	In wet well: 2 checks, 2 manuals, Mag meter, air release, floats
	Overflow System	☐	☐	N/A
	No Infiltration	☑	☐	
	Durability Corrosion	☑	☐	
	Inlet and Outlets	☑	☐	
	Debris	☑	☐	
Mid-Floor Grating	Secure under load	☑	☐	new
	Connection to Concrete	☑	☐	
	Removable	☑	☐	
	No conflict with Pumps	☑	☐	
	Corrosion	☑	☐	
Access/Egress	Lift Davit Socket	☑	☐	
	Size of Opening	☑	☐	
	Ladder Condition	☑	☐	new
	Grab Handle upon Entry	☑	☐	safe guards right on grate
	Top Hatch Secured	☑	☐	
	Top Hatch Operation	☑	☐	
	Access to bottom of Well	☑	☐	
Electrical	Panel Secured	☑	☐	
	Panel Condition	☑	☐	

		OK	Not OK	Comments/Concerns
	Penetrations Sealed	☑	☐	
	Conduits Secured and Sealed	☑	☐	
	Lighting	☑	☐	
HVAC				
Ventilation				
	Adjustable Speed Blower	☑	☐	new
	Dexon Condition and Connection	☑	☐	new
	Vent piping condition	☑	☐	
	Vent piping secure	☑	☐	
	Wet Well Odor Control	☑	☐	

Item		OK	Not OK	Comments/Concerns
Wet Well Mechanical				
Piping	Secured	☑	☐	
	Corrosion	☑	☐	
Valves	Plug Valves	☑	☐	
Air Release	Piping Secured	☑	☐	
	Connection	☑	☐	
Pumps	Visual Condition	☑	☐	can't see
	Accessible (pull pumps)	☑	☐	
	Hoist Equipment	☑	☐	
				There is an extra valve on a future expansion dead end

Generator and Controls Building

Item		OK	Not OK	Comments/Concerns
General Durability	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
General Condition	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
	Roof	☐	☐	N/A
	Soffit & Fascia	☐	☐	N/A
	Door & Hardware (Panic)	☐	☐	N/A
	Ceiling	☐	☐	N/A
Forced Air Furnace	Operational	☐	☐	N/A
	Exhaust	☐	☐	N/A
Electrical	Lighting/Receptacles	☑	☐	
	UPS Operational	☑	☐	
	Fire Alarm (911)	☑	☐	
	Security (911)	☑	☐	
	SCADA Compatibility	☑	☐	
	PLC	☐	☐	
	Main Disconnect	☑	☐	
	Transfer Switch	☑	☐	

Item		OK	Not OK	Comments/Concerns
Generator	Genset Exhaust	☐	☐	N/A - Town has one portable generator on trailer that hooks up to lift stations
	Genset Muffler	☐	☐	N/A
	Genset Fuel Filling and Storage	☐	☐	N/A
	Genset Block Heater	☐	☐	N/A
	Genset Battery	☐	☐	N/A
Control Panel	HOA	☑	☐	
	Pump Starters/VFD's	☑	☐	No VFD's
	Hour Meters	☑	☐	
	HMI	☑	☐	
	Autodialer	☑	☐	

Misc./Others Town's only LS with discharge meter

General Comments generator hook-up not rated for portable generator

Town of Redcliff Wastewater/Sanitary System Evaluation
Lift Station Inspection Check List

Lift Station:
Date: July 18, 2012
By: MPE Engineering Ltd.

File: N\34\00\003\Lift Station Site Review

Present:	Name	Company
	Dean	Town
	Patrick Boyd	MPE

Pictures: 1305 through 1316

Item		**OK**	**Not OK**	**Comments/Concerns**
Site				
Proximity to Public Facilities or Residences		☐	☑	Residence always complains about smell
360 Access to Wet Well	For Confined Space	☑	☐	
	For Major Maintenance	☑	☐	
360 Access to Building	To Transformer	☑	☐	
	For General Maintenance	☑	☑	
Operator Parking		☑	☐	
Site Security		☐	☐	No fence, security not an issue
General Layout	Public Safety	☑	☐	
Electrical	Transformer Secured	☑	☐	
	Transformer Accessible	☑	☐	
Valves	Operable	☐	☐	N/A
	Location/Accessible	☑	☐	In wet well

Wet Well General

		OK	Not OK	Comments/Concerns
Wet Well Condition	Benching	☐	☐	N/A can't see
	Overflow System	☐	☐	N/A
	No Infiltration	☑	☐	
	Durability Corrosion	☑	☐	
	Inlet and Outlets	☑	☐	
	Debris	☐	☑	Backs up quick to floor level. Debris on floor. Not very deep.
Mid-Floor Grating	Secure under load	☑	☐	
	Connection to Concrete	☑	☐	
	Removable	☑	☐	
	No conflict with Pumps	☑	☐	
	Corrosion	☑	☐	
Access/Egress	Lift Davit Socket	☑	☐	
	Size of Opening	☑	☐	
	Ladder Condition	☑	☐	
	Grab Handle upon Entry	☑	☐	ladder hard to get at when entering
	Top Hatch Secured	☑	☐	
	Top Hatch Operation	☑	☐	
	Access to bottom of Well	☑	☐	
Electrical	Panel Secured	☑	☐	
	Panel Condition	☑	☐	

		OK	Not OK	Comments/Concerns
	Penetrations Sealed	☑	☐	
	Conduits Secured and Sealed	☑	☐	
	Lighting	☑	☐	
HVAC				
Ventilation				
	Adjustable Speed Blower	☑	☐	
	Dexon Condition and Connection	☑	☐	
	Vent piping condition	☑	☐	
	Vent piping secure	☑	☐	
	Wet Well Odor Control	☐	☑	Residents complain due to location and proximity

Item		OK	Not OK	Comments/Concerns
Wet Well Mechanical				
Piping	Secured	☑	☐	
	Corrosion	☑	☐	some corrosion evident
Valves	Plug Valves	☑	☐	
Air Release	Piping Secured	☑	☐	
	Connection	☑	☐	Severe corrosion, Town will replace when fails with a plastic unit
Pumps	Visual Condition	☑	☐	
	Accessible (pull pumps)	☐	☐	
	Hoist Equipment	☐	☐	

Generator and Controls Building

Item		OK	Not OK	Comments/Concerns
General Durability	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
General Condition	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
	Roof	☐	☐	N/A
	Soffit & Fascia	☐	☐	N/A
	Door & Hardware (Panic)	☐	☐	N/A
	Ceiling	☐	☐	N/A
Forced Air Furnace	Operational	☐	☐	N/A
	Exhaust	☐	☐	N/A
Electrical	Lighting/Receptacles	☑	☐	
	UPS Operational	☑	☐	
	Fire Alarm (911)	☑	☐	
	Security (911)	☑	☐	
	SCADA Compatibility	☑	☐	
	PLC	☐	☐	
	Main Disconnect	☑	☐	
	Transfer Switch	☑	☐	

Item		OK	Not OK	Comments/Concerns
Generator	Genset Exhaust	☐	☐	N/A - Portable Generator
	Genset Muffler	☐	☐	N/A
	Genset Fuel Filling and Storage	☐	☐	N/A
	Genset Block Heater	☐	☐	N/A
	Genset Battery	☐	☐	N/A
Control Panel	HOA	☐	☐	
	Pump Starters/VFD's	☑	☐	No VFD
	Hour Meters	☑	☐	
	HMI	☑	☐	
	Autodialer	☑	☐	

Misc./Others # 2 of 5 for infiltration

General Comments

Town of Redcliff Wastewater/Sanitary System Evaluation
Lift Station Inspection Check List

Lift Station: Redcliff Way
Date: July 18, 2012
By: MPE Engineering Ltd.

File: N\34\00\003\Lift Station Site Review

Present:

Name	Company
Dean	Town
Patrick Boyd	MPE

Pictures: 1317 through 1327

Item		OK	Not OK	Comments/Concerns
Site				
Proximity to Public Facilities or Residences		☑	☐	
360 Access to Wet Well	For Confined Space	☐	☑	close proximity to parked trailers. Town not sure where the ROW is. Trailers are permanently parked there.
	For Major Maintenance	☐	☑	
360 Access to Building	To Transformer	☐	☑	
	For General Maintenance	☐	☑	
Operator Parking		☐	☑	no parking, blocked by parked trailers.
Site Security		☑	☐	no issues
General Layout	Public Safety	☑	☐	
Electrical	Transformer Secured	☑	☐	
	Transformer Accessible	☑	☐	
Valves	Operable	☐	☐	N/A
	Location/Accessible	☐	☐	In shed above ground

Wet Well General

		OK	Not OK	Comments/Concerns
Wet Well Condition	Benching	☐	☐	Can't see. Very slight evidence
	Overflow System	☐	☐	N/A
	No Infiltration	☑	☐	
	Durability Corrosion	☑	☐	
	Inlet and Outlets	☑	☐	
	Debris	☑	☐	
Mid-Floor Grating	Secure under load	☑	☐	
	Connection to Concrete	☑	☐	
	Removable	☑	☐	
	No conflict with Pumps	☑	☐	
	Corrosion	☑	☐	
Access/Egress	Lift Davit Socket	☐	☑	Does not lift pumps. Need hoe or crane
	Size of Opening	☑	☐	
	Ladder Condition	☐	☑	rungs, no ladder
	Grab Handle upon Entry	☐	☑	corrosion evident. Looks "homemade"
	Top Hatch Secured	☑	☐	
	Top Hatch Operation	☑	☐	
	Access to bottom of Well	☑	☐	
Electrical	Panel Secured	☑	☐	
	Panel Condition	☑	☐	

		OK	Not OK	Comments/Concerns
	Penetrations Sealed	☑	☐	
	Conduits Secured and Sealed	☑	☐	
	Lighting	☑	☐	
HVAC				
Ventilation				
	Adjustable Speed Blower	☐	☑	No vent installed in wet well
	Dexon Condition and Connection	☐	☐	N/A
	Vent piping condition	☐	☐	N/A
	Vent piping secure	☐	☐	N/A
	Wet Well Odor Control	☐	☐	N/A

Item		OK	Not OK	Comments/Concerns
Wet Well Mechanical				
Piping	Secured	☑	☐	comes up to fiberglass building freezes in winter
	Corrosion	☑	☐	
Valves	Plug Valves	☑	☐	check valves freeze in winter
Air Release	Piping Secured	☑	☐	no air release. Would cause spray in building
	Connection	☐	☐	
Pumps	Visual Condition	☐	☐	Can't see
	Accessible (pull pumps)	☑	☐	
	Hoist Equipment	☐	☑	Doesn't lift pumps. Life line ok

Generator and Controls Building

Item		OK	Not OK	Comments/Concerns
General Durability	Interior	☐	☐	N/A - portable generator
	Exterior	☐	☐	N/A
General Condition	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
	Roof	☐	☐	N/A
	Soffit & Fascia	☐	☐	N/A
	Door & Hardware (Panic)	☐	☐	N/A
	Ceiling	☐	☐	N/A
Forced Air Furnace	Operational	☐	☐	N/A
	Exhaust	☐	☐	N/A
Electrical	Lighting/Receptacles	☑	☐	street light
	UPS Operational	☐	☑	No Phone Service
	Fire Alarm (911)	☐	☑	
	Security (911)	☐	☑	
	SCADA Compatibility	☐	☑	
	PLC	☐	☐	
	Main Disconnect	☑	☐	
	Transfer Switch	☑	☐	

Item		OK	Not OK	Comments/Concerns
Generator	Genset Exhaust	☐	☐	N/A
	Genset Muffler	☐	☐	N/A
	Genset Fuel Filling and Storage	☐	☐	N/A
	Genset Block Heater	☐	☐	N/A
	Genset Battery	☐	☐	N/A
Control Panel	HOA	☐	☐	N/A
	Pump Starters/VFD's	☑	☐	No VFD
	Hour Meters	☑	☐	no 2 pump reading
	HMI	☑	☐	
	Autodialer	☐	☑	No Phone Service

Misc./Others

General Comments

No Vent in building, no blower, no air
just in building
Oldest LS
smallest, pumps 1 hr/ day
no dialer, phone service
operators know of any problems from hours

Town of Redcliff Wastewater/Sanitary System Evaluation
Lift Station Inspection Check List

Lift Station:
Date: July 18, 2012
By: MPE Engineering Ltd.

File: N\34\00\003\Lift Station Site Review

Present:	Name	Company
	Dean	Town
	Pat Boyd	MPE

Pictures: 1328 through 1338

Item		OK	Not OK	Comments/Concerns
Site				
Proximity to Public Facilities or Residences		☑	☐	
360 Access to Wet Well	For Confined Space	☑	☐	
	For Major Maintenance	☑	☐	
360 Access to Building	To Transformer	☑	☐	
	For General Maintenance	☑	☐	no site problems. O/H Power, never an issue
Operator Parking		☑	☐	
Site Security		☑	☐	
General Layout	Public Safety	☑	☐	
Electrical	Transformer Secured	☑	☐	
	Transformer Accessible	☑	☐	
Valves	Operable	☐	☐	N/A
	Location/Accessible	☑	☐	in wet well

Wet Well General

		OK	Not OK	Comments/Concerns
Wet Well Condition	Benching	☐	☐	can’t see
	Overflow System	☐	☐	n/a
	No Infiltration	☑	☐	
	Durability Corrosion	☐	☐	can't see
	Inlet and Outlets	☑	☐	
	Debris	☑	☐	
Mid-Floor Grating	Secure under load	☑	☐	
	Connection to Concrete	☑	☐	
	Removable	☑	☐	
	No conflict with Pumps	☑	☐	
	Corrosion	☑	☐	from visual at surface
Access/Egress	Lift Davit Socket	☑	☐	
	Size of Opening	☑	☐	
	Ladder Condition	☑	☐	
	Grab Handle upon Entry	☑	☐	
	Top Hatch Secured	☑	☐	
	Top Hatch Operation	☑	☐	
	Access to bottom of Well	☑	☐	
Electrical	Panel Secured	☑	☐	
	Panel Condition	☑	☐	

	OK	Not OK	Comments/Concerns
Penetrations Sealed	☑	☐	
Conduits Secured and Sealed	☑	☐	
Lighting	☑	☐	

HVAC

Ventilation

	OK	Not OK	Comments/Concerns
Adjustable Speed Blower	☑	☐	
Dexon Condition and Connection	☑	☐	
Vent piping condition	☑	☐	
Vent piping secure	☑	☐	
Wet Well Odor Control	☑	☐	

Item		OK	Not OK	Comments/Concerns
Wet Well Mechanical				
Piping	Secured	☑	☐	
	Corrosion	☑	☐	
Valves	Plug Valves	☑	☐	
Air Release	Piping Secured	☑	☐	
	Connection	☑	☐	
Pumps	Visual Condition	☑	☐	
	Accessible (pull pumps)	☑	☐	
	Hoist Equipment	☐	☐	

Generator and Controls Building

Item		OK	Not OK	Comments/Concerns
General Durability	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
General Condition	Interior	☐	☐	N/A
	Exterior	☐	☐	N/A
	Roof	☐	☐	N/A
	Soffit & Fascia	☐	☐	N/A
	Door & Hardware (Panic)	☐	☐	N/A
	Ceiling	☐	☐	N/A
Forced Air Furnace	Operational	☐	☐	N/A
	Exhaust	☐	☐	N/A
Electrical	Lighting/Receptacles	☑	☐	
	UPS Operational	☑	☐	
	Fire Alarm (911)	☑	☐	
	Security (911)	☑	☐	
	SCADA Compatibility	☑	☐	
	PLC	☐	☐	
	Main Disconnect	☑	☐	
	Transfer Switch	☑	☐	

Item		OK	Not OK	Comments/Concerns
Generator	Genset Exhaust	☐	☐	N/A - portable generator
	Genset Muffler	☐	☐	N/A
	Genset Fuel Filling and Storage	☐	☐	N/A
	Genset Block Heater	☐	☐	N/A
	Genset Battery	☐	☐	N/A
Control Panel	HOA	☐	☐	N/A
	Pump Starters/VFD's	☑	☐	No VFD
	Hour Meters	☑	☐	
	HMI	☑	☐	
	Autodialer	☑	☐	

Misc./Others Runs less than 1 hour per day. Low flow.

General Comments Upgraded 6 years ago

APPENDIX F

CCTV Inspection Tables

CCTV Inspection Findings			
Infiltration Found in Sanitary Sewer Inspection Videos			
Video ID	**Location**	**Cause**	**Comments**
D892-RC	1.2m	Fracture	
D94F-RC	31.9m	100mm ø service connection	
D946-RC	23m	Root infiltration at joint	
D9BF-RC	64m	100mm ø service connection	
D97B-1-RC	2.2; 3.7; 5.5m	100mm ø junction; 100mm ø service connection; 100mm ø service connection	
D9C0-RC	40m	100mm ø service connection	
Likely Points of Infiltration Based on Pipe Condition			
Video ID	**Location**	**Possible Cause of Infiltration**	**Comments**
D943-RC	1; 14.6m	Fracture; Fracture and root infiltration	
D937-RC	1; 5; 6; 11; 13.2m	Fracture; Displaced joint and root infiltration; Fracture; Root Infiltration; Displaced joint	
D892-RC	3.3; 19.1; 27.9m	Open joint; Broken pipe; Displaced joint	
D8B7-RC	1.3; 2m	Fractures	
D8B8	2.4; 5m	Displaced joints	This video is not in the Sanitec report
D8B7-1-RC	2.4m	Possible infiltration	Hard to see on video
D8B3-RC	1; 1.5; 1.6; 2m	Fractures	
D8B3-RC (Part2)	55.1; 56.5; 64.8m	Fracture and encrustation; Fracture; Fracture	
D8B3-RC (Part3)	14.6; 14.9; 15.5; 17.8; 20.5; 37.1; 49; 55m	Fracture; Fracture; Open joint; Open joint; Fracture; Fracture; Displaced joint; Fracture	
39FD5-RC	15.9; 18.3; 46.3m	Open joint; Displaced joint; Open joint	
D94F-RC (Part1)	85.9; 87.9; 105.8; 106.5m	Root infiltration; Fracture; Fracture and root infiltration; Root infiltration	
D94F-RC (Part2)	1-52.5; 31.9m	Root infiltration at almost every joint; Fracture	
D97B-RC	1m	Fracture	
D946-1-RC	1; 10; 10.5; 16; 17.6; 19.8; 25m	Displaced joint; Fracture; Fracture; Fracture; Fracture; Broken pipe; Possible infiltration	Camera zoomed in on 25m, looks like infiltration but unable to tell for sure
D946-RC	16.1; 18.2; 23.3; 26; 55.3; 60.1; 68; 74.6m	Displaced joint; Displaced joint; Open joint; Displaced joints	
D948-RC (Part1)	36.8; 38.1m	Root infiltration	
D948-RC (Part2)	1-35; 22.3; 23.9m	Root infiltration at almost every joint; Fracture; Fracture	
D975-1-RC	1; 2; 2.7; 3.4; 4.1	Fracture; displaced joints	
D975-RC (Part1)	42.1; 45m	Root infiltration; Fracture and encrustation	
D975-RC (Part2)	1-31; 1; 3; 3.3; 17.3; 24.3m	Root infiltration at most joints; Fracture with encrustation; Fracture; Displaced joint; Hole in pipe filled with roots	
D9C8-1-RC	1m	Displaced joint	
D97B-1-RC (Part1)	1-24.8; 1.2; 6.4m	Root infiltration at several joints; Fractures with encrustation	
D97B-1-RC (Part2)	27m	Root infiltration	
D97B-RC	1-13.4; 1m	Root infiltration at several joints; Fracture with encrustation	
D993-RC	75; 75.6m	Broken pipe (at both ends of section); Displaced joint	
D993-1-RC	1; 1.9; 2.3; 4.4	Fracture; Fracture; Fracture; Fracture and displaced joint	
D993-RC	1; 11.4; 46; 47.6; 54.6m	Fracture; Fracture with root infiltration; Root infiltrations	
D994-1-RC	6.2; 7m	Root infiltration	
D994-RC	1-30.7; 1m	Root infiltration at several joints; Fracture	
D995-RC	11.1; 22.4; 29.4; 44.9m	Root infiltration; Root infiltration; Root infiltration; Fracture	
D9C8-2-RC	1.4m	Displaced joint	
DA7B-RC	1.5; 1.6; 3.5; 4.6; 6.9; 13; 17; 19.2; 20.8; 23.1; 24.7m	Crack with encrustation; Fracture; Crack; Fracture; Crack; Fracture; Open joint; Displaced joint; Displaced joint; Fracture; Displaced joint	

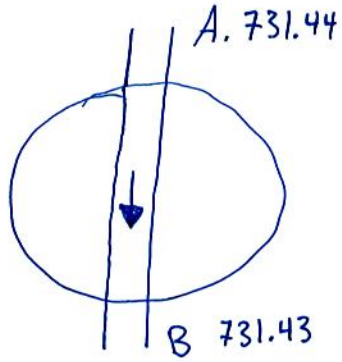
		Location				Pipe Description				Structural Defects: Displaced Joints				Open Joint				Cracking				Fractures				Breaks /Holes		Holes	Deformation					Sagging				Debris/Obstructions				Roots				Encrustration				Service Connection Description	Infiltration	Infiltration				Structural		Service			
Comments	Video	Street	From	To	Phase	Material	Diameter (mm)	Length	Year Built	Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Breaks/Holes		Description	Light	Moderate	Severe	Pipe Collapsed	General Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	General Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Description	Light	Moderate	Severe	Total Structural Score	Structural Condition Rating	Total Service Score	Service Condition Rating	Overall Condition Rating	Service Condition rating + Structural Condition Rating
	D943-RC	1st Ave NE	D943	D892		VC	200	14.6	1950									at 14.5m out from connection	1			at 1m and 14.6m		1	1																	at 14.6m		1						100 dia intruding connection at 14.5m (camera stuck)					56	3	10	2	3	5
	D937-RC	2nd Street NE	D937	DA7B		VC	200	13.2	1950	at 5m and 13.2m	1		1					at 1m 1.5, and 7.5m	1	2		at 1m and 6m	1	1									at 11m			1	at 2.9, 4.5, 7.5 and 11.9	4			at joints between 5m and 11m	6							100 dia connection at 12.4 and 12.8m					120	4	30	3	4	7
	D892-RC	Certainteed Access Rd	39FD5	D892		VC	200	43.7	1950	at 27.9		1		at 3.3m		1		at 19.1		1		at 19.1 and 1.2m		1	1	pipe broken at 19.1m								at 29.7, 39.9, 5, and 14	2	2		at 1.2 and 43.7m (camera stuck)		2						at 19.1 and 20.1	2				at 1.2m	1			144	4	29	3	4	7
same at #47	D9C0-RC	5th St NW	D9C4	D9C0		PVC	200	0																																																0	1	0	1	1	2
	D8CF-RC	9th Ave SE	D8CF	D8B8		PVC	450	105.5	1980																									at 86m	2			at 28.5, 36.8, 51.4	3											100 dia connections at 23.4, 28.5, 78.3m					20	2	9	1	2	3
	D8CE-RC	9th Ave SE	D8CF	D8CE		PVC	450	4.6	1980																																															0	1	0	1	1	2
CO?	D8BB-RC	9th Ave SE	D8BB	D8B9		CO	450	6.5	1980																													at 1.7, 3.3, 6.2, 6.5 (camera stuck)	2	2															0	1	26	3	3	4
	D8BB-1-RC	9th Ave SE	D8B9	D8BB		PVC	450	80	1980																									at 15.5, 31.5, 53.4, 73.8	4			at 20.4, 46.7, 79, 80 (camera stuck)	3	1															40	2	19	2	2	4
	D8B9-RC	9th Ave SE	D8CE	D8B9		PVC	450	88.3	1980																									at 17, 37.9-48, 52-73	1	2		at 88.3 (camera stuck)		1															60	3	10	2	3	5
	D8B9-1-RC	9th Ave SE	D8B9	D8CE		PVC	450	5.6	1980																													at 4.3 and 5.5 (camera stuck at 5.6) (looks like obstruction farther down pipe)		2															0	1	20	3	3	4
	D8B7-RC	4th St SE	D8B7	D8B8		VC	200	8.9	1970													at 1.3 and 2m		2										at 7.2m		1		at 5.9 and 8.6	1	1						at 5.9, 7.2, 8.9m	3						55	3	22	3	3	6
not in report	D8B8-D8B7	4th St SE	D8B8	D8B7		VC	200	2.6	1970	at 2.4 and 5m			2																																										80	3	0	1	3	4
	D8B7-1-RC	4th St SE	D8B8	D8B7		PVC	200	2.4	1970																																										possibly at 2.4 (difficult to tell for sure)		1			0	1	10	2	2	3
Part1 (1-4.3m)	D8B3-RC	4th St SE	D8B7	D8B3		VC	200	4.3	1970									at 1m		2		at 1, 1.6, 2, and 1.5m		4	1				at 1.5m		1			at 4m	1			at 2m		1						at 4.3m	1			100 dia connections at 1.6(broken) and 2m					164	5	13	2	5	7
Part2 (55.1-66m)	D8B3-RC	4th St SE	D8B7	D8B3		VC	200	10.9	1970									at 65.1m		1		at 55.1, 56.5, 64.8m		2	1													sludge in pipe at 66m, too thick for camera		2						at 55.1, 56.5, 60.7, 57.9, 62m	3	2		100 dia connection at 64.5 and 65.1					72	3	49	4	4	7
Part3 (4.3-55m)	D8B3-RC	4th St SE	D8B7	D8B3		VC	200	50.8	1970	at 49m	1			at 15.5 and 17.8m	2			at 15.3, 28.9, 15.8, 30.9	2	2		at 37.1, 55, 14.6, 14.9, 20.5m		2	3									at 24-25m	1			at 14.9, 31.3, 45.9m		1	2					at 4.3, 14.6, 37.1, 52.2, 17.8m	4	1		100 dia connection at 14.9, 15.5 (open joint at connection), 31, 31.3 (intruding), 45.9, 46.3					173	5	82	5	5	10
	39FD5-RC	Certainteed Parking Lot	39FD5	39FD4		VC	200	51.3	1950	at 18.3		1		at 46.3, 15.9m	1	1		at 1.3m			1													at 25-27, 44-45	2			at 1.3, 15.8, 20.5, 21.3, 22.3, 24.6, 51.3 (camera stuck)	6	1															43	2	28	3	3	5
																																																							0	1	0	1	1	2
Part 1 (52.5-108.3)	D94F-RC	4th St SE	D948	D94F		VC	200	55.8	1950									at 52.5, 72.7, 77.2, 105.8, 106.6,	6			at 87.9, 105.8	1	1										at 99m	1			at 80, 91, 107.7	2	1		at 105.8, 85.9, 106.5	1	2						100 dia junction at 64.7, 71.1(closed off), 77.9 (closed off), 92.3 (filled with soil) 100 dia connection 52.5, 73, 77.2 (intruding), 85.9 (intruding), 92.1, 105.1, 105.8, 106.5 (roots in connection)					36	2	39	4	4	6
Part 2 (1-52.5)	D94F-RC	4th St SE	D948	D94F		VC	200	52.5	1950									at 5m		1		at 31.9m	1											at 40, 31m	1	1		at 2.3, 8.6, 8.9, 13.4,	4			root infiltration at almost every joint	30	2					100 dia connection at 28.5, 30.3, 31.9, 47.5, 47.8, 48.2m 100 dia junction at 48.9m	at 31.9m	1			42	2	125	5	5	7
	D97B-RC	2nd St SE	D97B	D975		VC	200	1.1	1950													at 1m		1																														15	1	0	1	1	2
Very steamy, hard to see	D943-1-RC	1st Ave NE	D892	D943		VC	200	29.2	1950																									at 7.2, 15.4, 17.3, 18.6	4			at 22.5	1															40	2	3	1	2	3
	D946-1-RC	1st Ave NE	D946	D943		VC	200	25	1960	at 1, 19.8m		2						at 7.7, 14.5, 1, 13.8	2	3		at 10, 10.5, 16, 17.6, 19.8		5	1	pipe broken at 19.8m (camera stuck)			at 9.7-11m pipe is crooked		1			at 3, 13.5	2							at 10.5	1							at 10.5m (large chip in connection)	possible at 25m, hard to tell from zoom		1		223	5	13	2	5	7
	D946-RC	1st Ave NE	D943	D946		VC	200	80.3	1960	at 16.1, 18.2, 26, 55.3, 60.1, 74.6m	5	1		at 23.3m	1			at 23.3, 68m	2										at 48.5 (pipe curves)	1			at 74.6, 3	1	1		at 35.6, 48.5, 51.1, 62, 77.8, 80.3(camera stuck)	5	1		at 23m	1											at 23m	1			98	3	31	3	3	6
Part 1 (35.5-103.1)	D948-RC	1st Ave NE	D948	D946		VC	200	67.6	1960																									at 94.7m	1			light debris along most of pipe bottom	7	1		at 36.8, 38.1	2												10	1	37	4	4	5
Part 2 (1-35)	D948-RC	1st Ave NE	D948	D946		VC	200	35.4	1960									at 20, 22.3, 23.5, 25.4m	3	1		at 22.3, 23.9		2					at 14.9 (pipe looks cut)	1							at 1, 6.3, 33.4	3			roots at almost every pipe joint	32	4	1					100 dia connection at 23.5, 25.8					55	3	170	5	5	8
	D975-1-RC	2nd St SE	D8D9	D975		VC	200?	5.8	1950	at 2, 2.7, 3.4, 4.1		4						at 1m		1	1	at 1m		1										at 5.5m	1			at 4.7, 5.8 (camera stuck)	1	1															92	3	13	2	3	5
Part 1 (31-45.2m)	D975-RC	2nd St SE	D975	D8D9		VC	200?	14.2	1950									at 42.2m		2		at 45m			1									at 32.6m	1			at 33, 45.2(camera stuck)	1	1		at 42.1	1			at 45, 45.2		2						54	3	36	4	4	7
Part 2 (1-31m)	D975-RC	2nd St SE	D975	D8D9		VC	200	31	1950	at 17.3m		1						at 1.7m	1			at 1, 3.3m		3		hole near connection at 24.3m filled with roots		1						at 19.5	1			at 5.7, 9.5m	2			at 1, 1.7, 2.4, 8.7, 9.5, 10.2, 13.4, 17.3, 21.8, 23.6, 24.3; 4, 5.6,7; 24.3m	11	3	1	at 1, 2.4, 14.2, 14.9, 15.8, 27.6; 22.1	6	1		100 dia connection at 4.3 (blocked), 24.3 (fine roots in connection)					71	3	122	5	5	8
	D0B9-EC5E	6th St NW	D9B9	EC5E		PVC	200	86.9	1970																									at 53,65, 70, 79	3	1		at 36, 47.3, 49.5, 70.9	4							camera stuck in manhole at 1m, needed to be reset to pass encrustation		1						55	3	22	3	3	6
	D9BF-RC	5th St NW	D9BF	D9C0		PVC	200	85.9	1970																				at 3.6, 70	2			at 14.8, 62, 63.4, 79	4			at 4.1, 7.9; 10	2	1										100 dia connection at 64m	at 64m	1			80	3	19	2	3	5
noted that pipe looks bigger than 200	D9C8-1-RC	2nd Ave NW	D9C8	D9CB		PVC	200	34.7	1970	at 1m		1																						at 32	1			at 2.4, 11.2, 14.7, 27.2; 34.7(camera stuck)	4	1															25	2	22	3	3	5

										Structural Defects																												Service Defects																							
		Location				Pipe Description				Dsiplaced Joints				Open Joint				Cracking				Fractures				Breaks /Holes		Holes	Deformation					Sagging				Debris/Obstructions				Roots				Encrustation				Service Connection Description	Infiltration	Infiltration				Structural		Service			
Comments	Video	Street	From	To	Phase	Material	Diameter (mm)	Length	Year Built	Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Breaks/Holes		Description	Light	Moderate	Severe	Pipe Collapsed	General Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	General Description	Light	Moderate	Severe	Description	Light	Moderate	Severe	Description	Description	Light	Moderate	Severe		Total Structural Score	Structural Condition Rating	Total Service Score	Service Condition Rating	Overall Condition Rating	Service Condion rating + Structural Condition Rtaing
Part 1 (1-24.8)	D97B-1-RC	2nd St SE	D97B	D975		VC	200	24.8	1950									at 1.9, 2.8, 3.7; 1.6, 13.4, 15, 15.7	3	4		at 6.4; 1.2		1	1																	at several joints in pipe	12	3	2	at 1.2, 1.9, 2.2, 2.6, 2.9, 3.7, 5.1, 5.5, 6.4	9			100 dia junction at 2.2, 2.9(blocked), 6.7(heavy roots), 22.9 (blocked) 100 dia connection at 1.6 (intruding, blocked), 3.7, 3.8, 5.5 (fine roots), 6.4, 24.8	at 2.2, 3.7, 5.5	3				66	3	152	5	5	8
Part 2 (24.8-27.2)	D97B-1-RC	2nd St SE	D97B	D975		VC	200	2.4	1950									at 27m	2															at 25	1			camera won't go past intruding connection at 27m				at 27m	1							100 dia connection at 27m						12	1	3	1	1	2
	D97B-RC	2nd St SE	D975	D97B		VC	200	13.4	1950									at 1, 3.4, 6.4m		3		at 1m		2					at 2m (curves)	1				at 5.5; 10m	1	1		at 1.6		1		at several joints in pipe	14			at 1, 13.4m	2			100 dia connection at 13.4m (intruding, camera stuck)						91	3	58	5	5	8
from (70.8-75.6)	D993-RC	Elm Crt SE	D994	D993		VC	200	4.8	1970	at 75.6		1										pipe broken at both ends at 75m			2													at 75.6 (camera stuck at fracture)		1																95	3	10	2	3	5
	D993-1-RC	Elm Crt SE	D993	D994		VC	200	4.4	1970	at 4.4m		1						at 1.9m		1		at 1, 4.4; 1.9, 2.3, 4.4m(camera stuck)		2	6									at 3.1m	1			at 1.3, 2.3	2																	297	5	6	1	5	6
	D993-RC	Elm Crt SE	D994	D993		VC	200	70.3	1970									at 33.9, 48.9; 34.1m	3	1		at 1, 11.4; 11.4		2	1									at 2, 23, 56.5	3			at 7, 11.4, 13.8, 64.9; 28.3, 42	4	2		at 11.4, 47.6, 54.6; 46	3		1					3 100 dia junctions capped in wood at 38.6, 39.2, 65.6(gaps in wood) 100 dia connection at 11.4(intruding), 46, 48.9(intruding), 63.2, 63.6						105	4	66	5	5	9
	D994-1-RC	Elm Crt SE	D995	D994		VC	200	7	1970									at 6.2m	1																			at 5.1m	1			at 6.2, 7m	2							100 dia junction at 5.1(capped, soil debris) 100 dia connection at 6.2(intruding)						1	1	9	1	1	2
	D994-RC	Elm Crt SE	D994	D995		VC	200	30.7	1970									at 1m		1		at 1m		3														at 27.6	1			at 6.2, 7.6, 10.9, 13.8, 27.6, 30.7; 15, 25; 9.8, 16.4	6	2	2					100 dia junction at 9m (filled with roots) 100 dia connection at 30 (intruding, camera stuck)						47	2	91	5	5	7
	D995-RC	6th St SE	D995	D924		VC	200	54.6	1970									at 44.9, 54.4		2		at 44.9m		1										at 23.8, 32.5	2			at 2.4, 18.3	2			at 11.1, 22.4, 29.4	3													39	2	15	2	2	4
	D9C0-RC	5th St NW	D9C4	D9C0		PVC	200	85.6	1970																				Pipe almost entirely deformed (squished down)	1								at 3.1, 5.7	2							at 33.4, 40, 40.1, 85.6		4		100 dia connection at 33.4(encrust. around joint), 40(encrust. in and around pipe)	dripping from top of connection at 40	1				20	2	49	4	4	6
noted that pipe looks larger than 250 (dimension changes at 7.4m)	D9C8-2-RC	2nd Ave NW	D9C8	D9CB		PVC	250?	50.8	1970	at 1.4m		1																						at 25, 36m	2			at 10.2, 27.3, 38.9, 46.4; 50.8(camera stuck)	1		1															75	3	28	3	3	6
camera stuck at bend at 102.6	D9CC-RC	3rd Ave NW	D9CC	D93E		PVC	200	102.6	2000																													at 1.9m	1											100 dia connection at 55.8						75	3	3	1	3	4
	DA7B-RC	2nd St SE	D97B	DA7B		VC	200	25.1	1960	at 19.2, 20.8, 24.7		3		at 17m	1			at 4.6, 10, 15; 1.5, 3.5, 6.9m		3	3	at 17; 1.6, 4.6, 13, 23.1m	1	4					pipe looks bowed in at 15.3m	1				at 21.7	1			at 25.1; 11.3m	1		1					at 1.6, 2.3, 3.1, 5.9, 7.7, 8.4; 1.1	6	1		100 dia junction at 11.3(blocked with soil) 100 dia connection at 4.2, 4.8(intruding), 23.1(fracture in connection)						162	5	56	5	5	10
noted pipe looks larger than 200	EC5A-RC	5th St NW	EC5A	D9CC		PVC	200	86.8	1970																									at 3, 28.5, 46.8m	3			at 23.9, 53.5, 66.4	3											100 dia junction at 86.5 (drop to MH) 5 100dia connections at 14.8, 17.2, 32.3, 48.7, 65.5						30	2	9	1	2	3
	EC5E-RC	6th St NW	D9C8	EC5E		PVC	200	86.1	1970																				at 10, 23m (squished down)	2				at 85m	1			at 2.5, 4.7, 9.4, 11.2	4							at 17.2m	1	1		100 dia connections at 17.2(encrust. in pipe) and 79.1						50	3	25	3	3	6

APPENDIX G

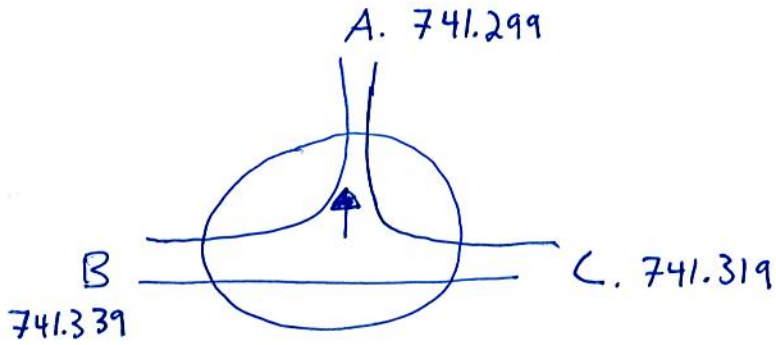
Survey Data

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



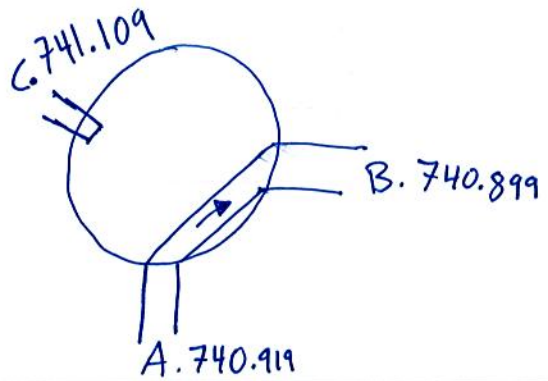
Manhole	Pipes			Location
Number D96E	Depth from Rim to Invert	Size	Material Type	Elbow Dr NE, North of
	A 3.01		VCT	Broadway, AVE East. 7st
Sanitary ☒ Storm ☐	B 3.02		VCT	MH N of intersection
Material	C			
Rim Elev 734.450	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



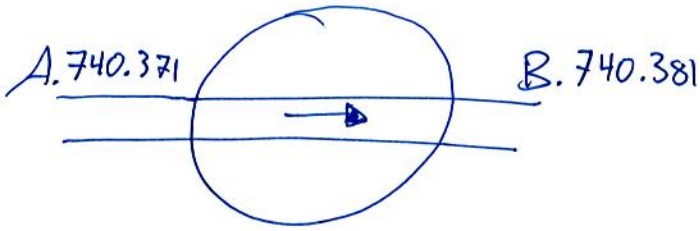
Manhole	Pipes			Location
Number 13991	Depth from Rim to Invert	Size	Material Type	Lockwood St NE
	A 3.93	200	VCT	North of Highway Ave NE
Sanitary ☒ Storm ☐	B 3.89	200	VCT	1st MH.
Material	C 3.91	200	VCT	
Rim Elev 745.229	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



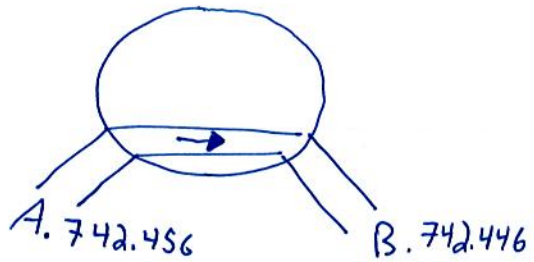
Manhole	Pipes			Location
Number D90B	Depth from Rim to Invert	Size	Material Type	Lockwood St NE and
	A 3.55	200	PVC	Saskatchewan Dr NE
Sanitary ☒ Storm ☐	B 3.57	200	PVC	in intersection
Material	C 3.36	150	PVC	
Rim Elev 744.469	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



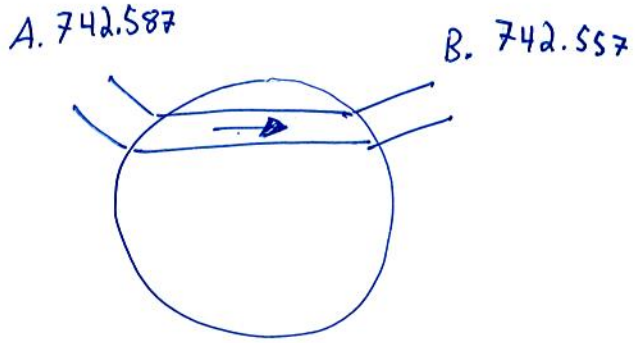
Manhole	Pipes			Location
Number D90A	Depth from Rim to Invert	Size	Material Type	Saskatchewan Dr NE 1st MH
	A 4.42	200	PVC	East of Lockwood St.
Sanitary ☒ Storm ☐	B 4.43	200	PVC	
Material	C			
Rim Elev 744.801	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



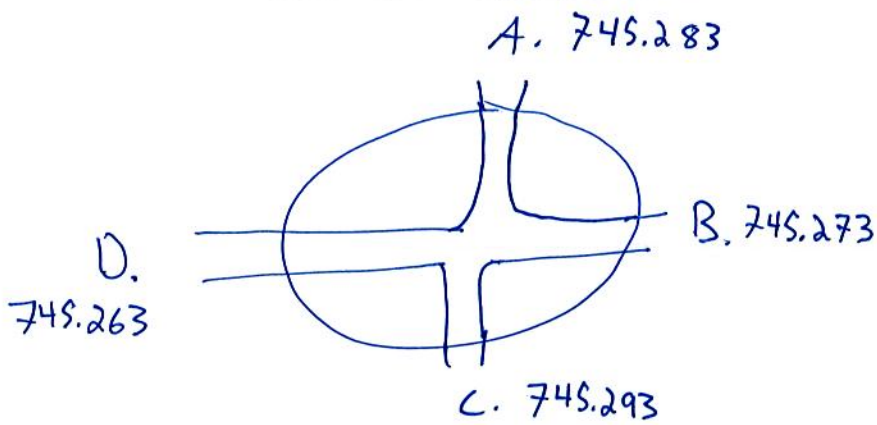
Manhole	Pipes			Location
Number EB40	Depth from Rim to Invert	Size	Material Type	9 St NE North of Highway
	A 3.91	200	PVC	Ave NE, part way up
Sanitary ☒ Storm ☐	B 3.92	200	PVC	street on east side of
Material	C			road.
Rim Elev 746.366	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



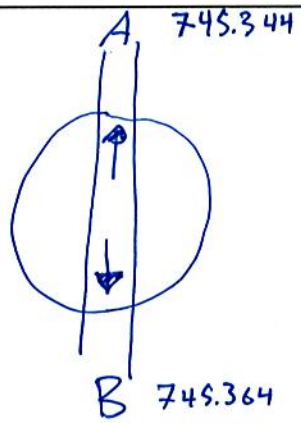
Manhole	Pipes			Location
Number EB41	Depth from Rim to Invert	Size	Material Type	9 St NE in alley North of
	A 3.37	200	PVC	Highway Ave NE on west
Sanitary ☒ Storm ☐	B 3.40	200	PVC	side of road
Material	C			
Rim Elev 745.957	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



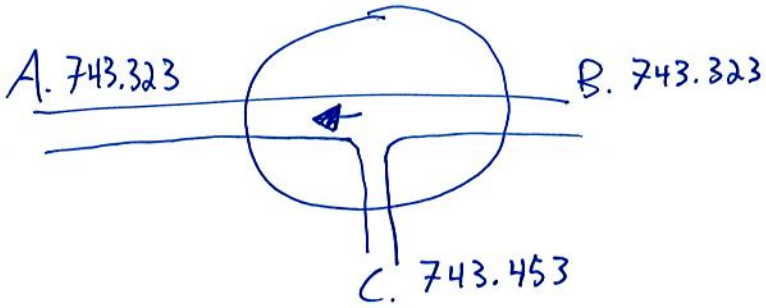
Manhole	Pipes			Location
Number D948	Depth from Rim to Invert	Size	Material Type	Intersection of
	A 3.07	200	VCT	1st Ave NE and
Sanitary ☒ Storm ☐	B 3.08	200	VCT	4th st NE
Material	C 3.06	200	VCT	
Rim Elev 748.353	D 3.09	200	VCT	Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



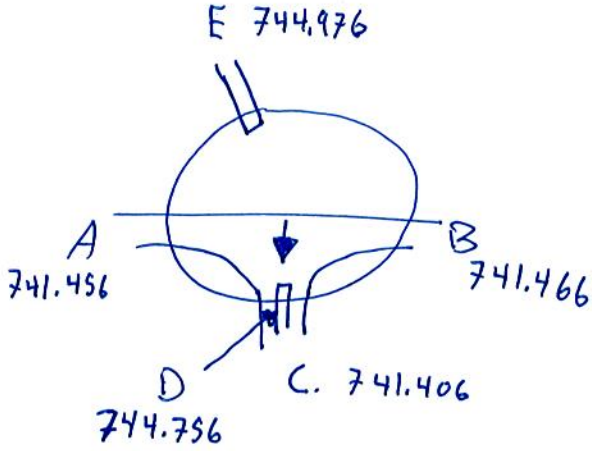
Manhole	Pipes			Location
Number D9E0	Depth from Rim to Invert	Size	Material Type	4th St NE North of
	A 2.03	200	PVC	1st Ave NE mid way
Sanitary ☒ Storm ☐	B 2.01	200	PVC	up the street.
Material	C			
Rim Elev 747.374	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



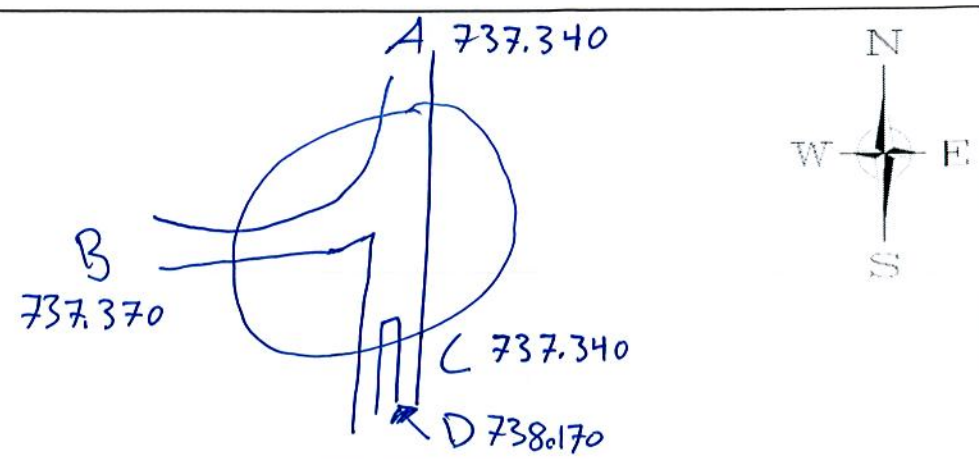
Manhole	Pipes			Location
Number 39FD3	Depth from Rim to Invert	Size	Material Type	On North side of fence
	A 5.47	200	VCT	at the end of Main St
Sanitary ☒ Storm ☐	B 5.47	200	VCT	North.
Material	C 5.34	200	VCT	
Rim Elev 748.793	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



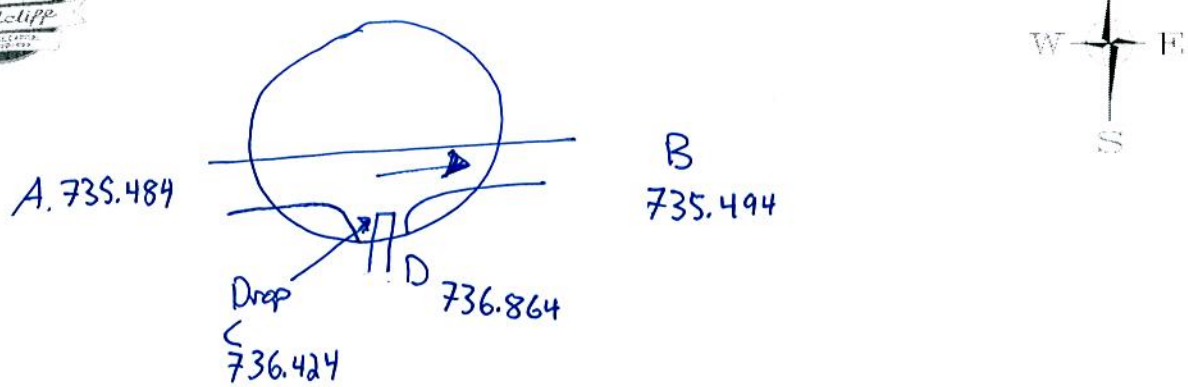
Manhole	Pipes			Location
Number 39FD2	Depth from Rim to Invert	Size	Material Type	On North side of fence
	A 6.25			at end of Broadway
Sanitary ☒ Storm ☐	B 6.24			Ct NW
Material	C 6.30			
Rim Elev 747.706	D 2.95			Date June 28, 2012
	E 2.73			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



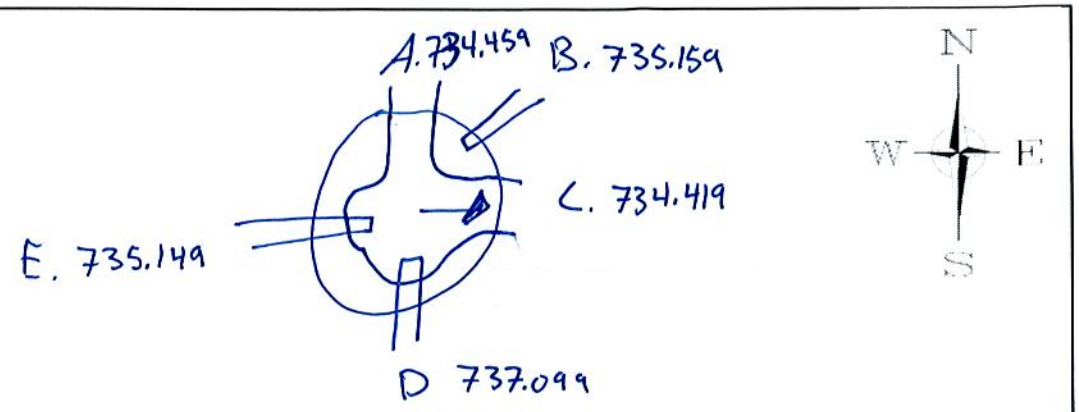
Manhole	Pipes			Location
Number D9CB	Depth from Rim to Invert	Size	Material Type	5st NW at 2 Ave NW
	A 4.83	200	PVC	
Sanitary ☒ Storm ☐	B 4.80	250?	PVC	
Material	C 4.83	200	PVC	
Rim Elev 742.170	D 4.00	200	PVC	Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



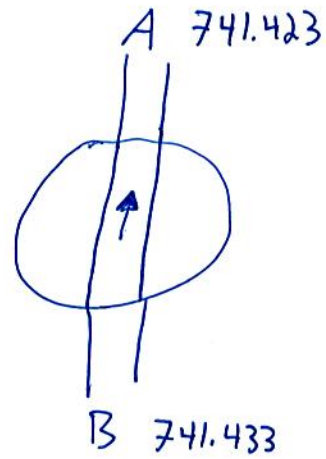
Manhole	Pipes			Location
Number D9CC	Depth from Rim to Invert	Size	Material Type	5st NW at 3 Ave NW
	A 3.64	250	VCT	
Sanitary ☒ Storm ☐	B 3.63	250	VCT	
Material	C 2.70	250	PVC	
Rim Elev 739.124	D 2.26	250	PVC	Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



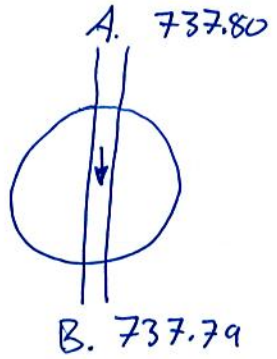
Manhole	Pipes			Location
Number D93E	Depth from Rim to Invert	Size	Material Type	Intersection of
	A 5.77	200	PVC	4th St NW and 3rd Ave NW
Sanitary ☒ Storm ☐	B 5.07	150	PVC	
Material	C 5.81	500?	PVC	
Rim Elev 740.229	D 3.13	250	PVC	Date June 28, 2012
	E 5.08		PVC	By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



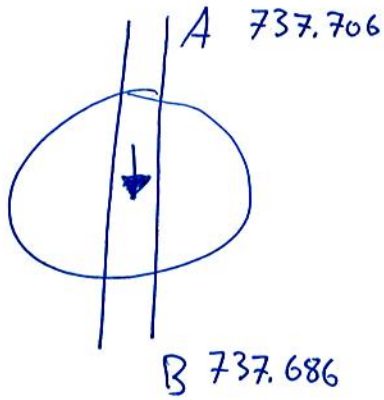
Manhole	Pipes			Location
Number D9BA	Depth from Rim to Invert	Size	Material Type	4st SW just south
	A 2.43	250	PVC	of 1st ave SW
Sanitary ☒ Storm ☐	B 2.42	250	PVC	
Material	C			
Rim Elev 743.853	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



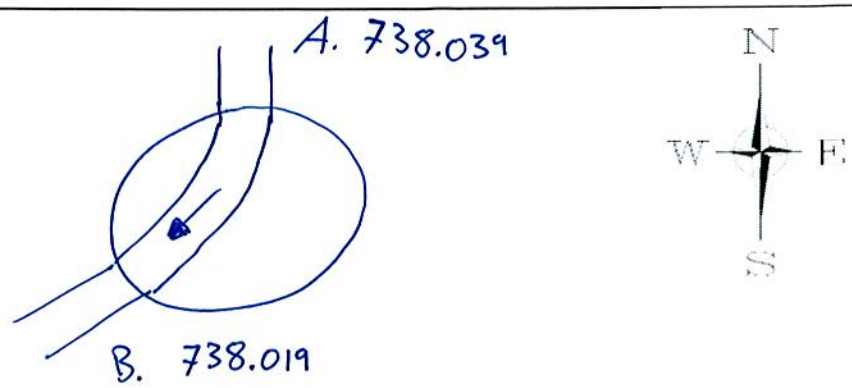
Manhole	Pipes			Location
Number D8EA	Depth from Rim to Invert	Size	Material Type	Main St at 7 AVE SE
	A 2.66	500	PVC	
Sanitary [X] Storm [ ]	B 2.67	500	PVC	
Material	C			
Rim Elev 740.460	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



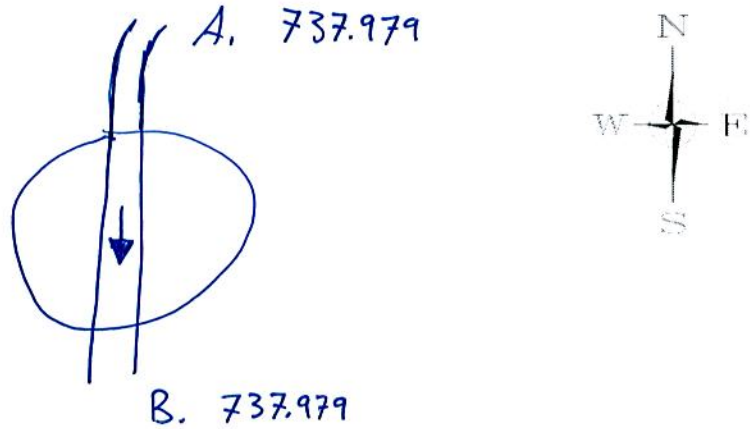
Manhole	Pipes			Location
Number D8EC	Depth from Rim to Invert	Size	Material Type	Main st midway between
	A 2.95	500	PVC	7 Ave SE and 8 AVE SE
Sanitary [X] Storm [ ]	B 2.97	500	PVC	
Material	C			
Rim Elev 740.656	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



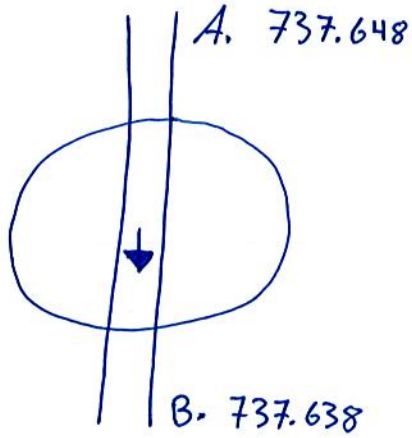
Manhole	Pipes			Location
Number D8F0	Depth from Rim to Invert	Size	Material Type	Just north of intersection
	A 2.54	250	VCT	at Main St and 8 Ave S
Sanitary ☒ Storm ☐	B 2.56	250	VCT	
Material	C			
Rim Elev 740.579	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



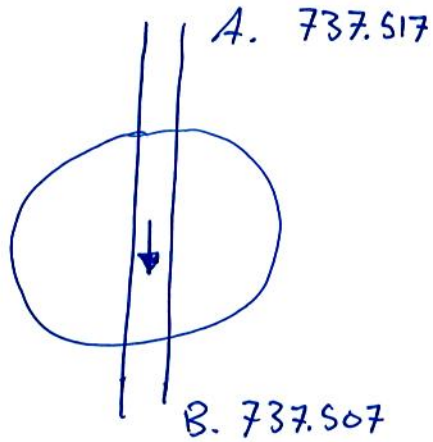
Manhole	Pipes			Location
Number D8F1	Depth from Rim to Invert	Size	Material Type	West side of intersection
	A 2.47	250	VCT	at main St S and 8 ave
Sanitary ☒ Storm ☐	B 2.47	250	VCT	S
Material	C			
Rim Elev 740.449	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00

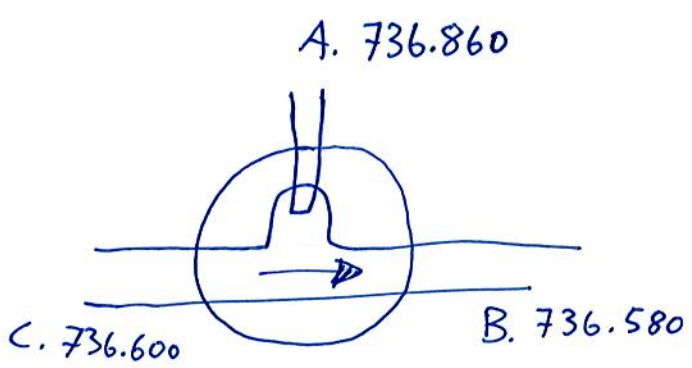


Manhole	Pipes			Location
Number D8DF	Depth from Rim to Invert	Size	Material Type	North of intersection at
	A 3.37	300	VCT	1 St SE and 8 Ave SE
Sanitary ☒ Storm ☐	B 3.38	300	VCT	
Material	C			
Rim Elev 741.018	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00

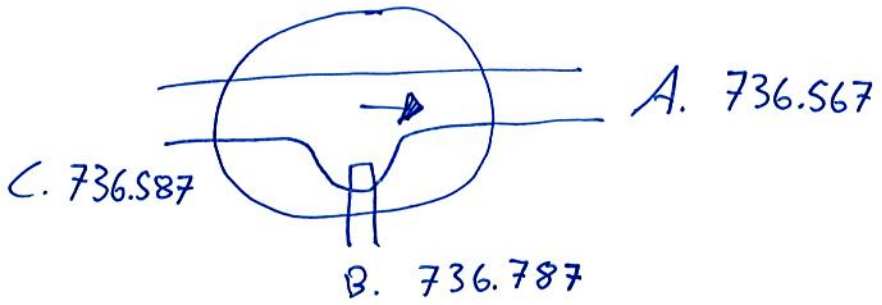


Manhole	Pipes			Location
Number D8C4	Depth from Rim to Invert	Size	Material Type	Midway between 8 Ave
	A 3.92	300	VCT	SE and 9 Ave SE on
Sanitary ☒ Storm ☐	B 3.93	300	VCT	1st St SE.
Material	C			
Rim Elev 741.437	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

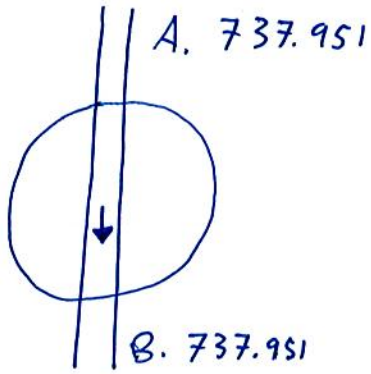


Manhole	Pipes			Location
Number D8CE	Depth from Rim to Invert	Size	Material Type	West MH at intersection of 9 Ave SE and 3st SE
	A 4.29	200	PVC	
Sanitary ☒ Storm ☐	B 4.57	500	VCT	
Material	C 4.55	500	VCT	
Rim Elev 741.150	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

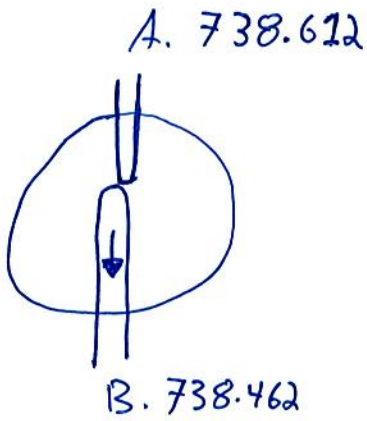
Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



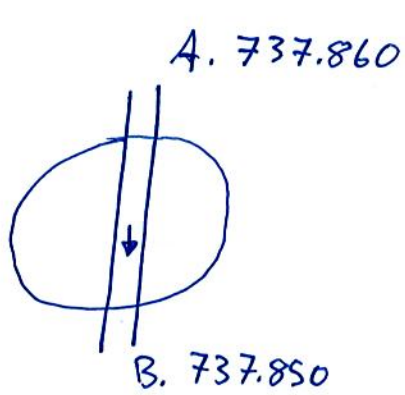
Manhole	Pipes			Location
Number D8CF	Depth from Rim to Invert	Size	Material Type	East MH at intersection of 9th Ave SE and 3 St SE.
	A 4.55	500	VCT	
Sanitary ☒ Storm ☐	B 4.33	200	PVC	
Material	C 4.53	500	VCT	
Rim Elev 741.117	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson



Manhole	Pipes			Location
Number D8E4	Depth from Rim to Invert	Size	Material Type	North of intersection at
	A 3.65	200	VCT	8th Ave SE and 3rd St SE
Sanitary ☒ Storm ☐	B 3.65	200	VCT	
Material	C			
Rim Elev 741.601	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

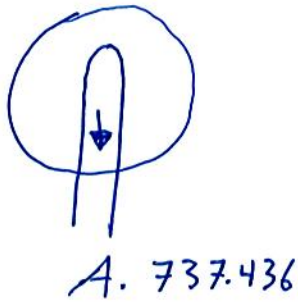


Manhole	Pipes			Location
Number D8C9	Depth from Rim to Invert	Size	Material Type	Intersection of 8th Ave SE
	A 2.84	200	PVC	and 4th St SE
Sanitary ☒ Storm ☐	B 2.99	200	VCT	
Material	C			
Rim Elev 741.452	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

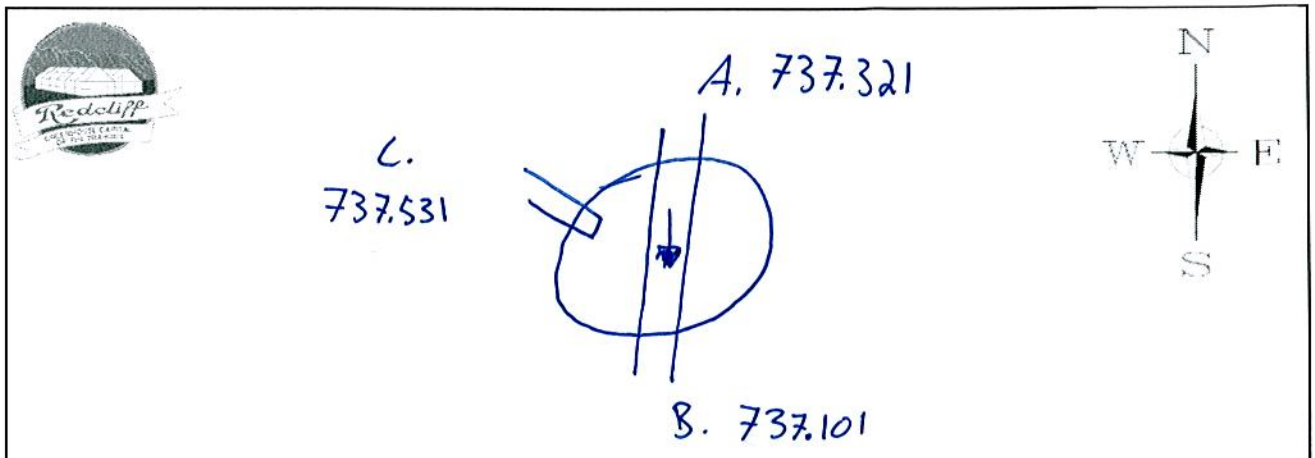


Manhole	Pipes			Location
Number D8DO	Depth from Rim to Invert	Size	Material Type	4 St SE midway between
	A 3.09	200	VCT	8 Ave SE and 9 Ave SE
Sanitary ☒ Storm ☐	B 3.10	200	VCT	
Material	C			
Rim Elev 740.950	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00

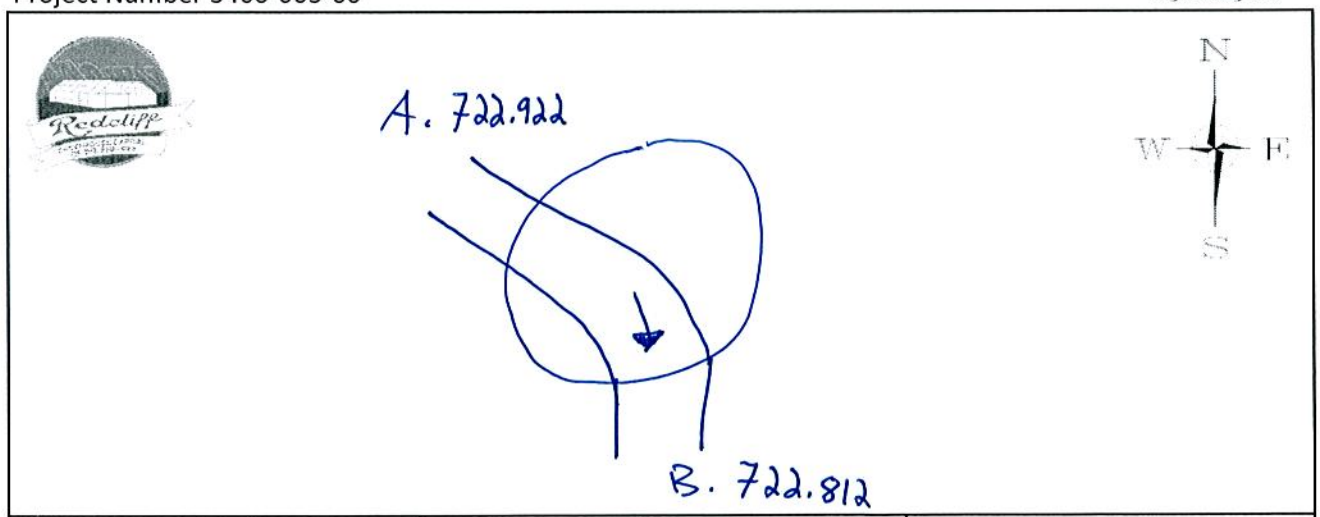


Manhole	Pipes			Location
Number D8CA	Depth from Rim to Invert	Size	Material Type	Intersection of 5th St
	A 2.80			SE and 8th Ave SE
Sanitary ☒ Storm ☐	B			
Material	C			
Rim Elev 740.236	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson



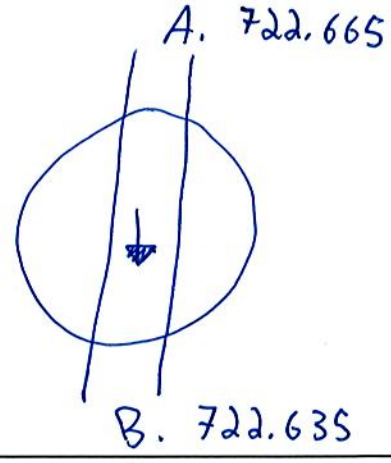
Manhole	Pipes			Location
Number D8CB	Depth from Rim to Invert	Size	Material Type	Intersection of 6th St
	A 2.05	200	PVC	SE and 8th Ave SE
Sanitary ☒ Storm ☐	B 2.27	200	PVC	
Material	C 1.84	100	PVC	
Rim Elev 739.371	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



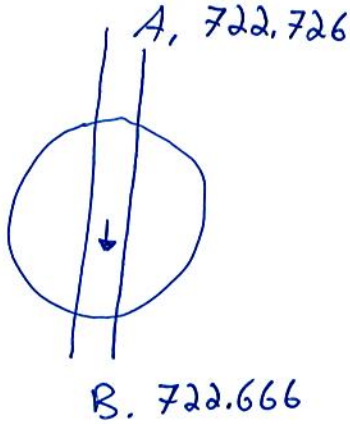
Manhole	Pipes			Location
Number E875	Depth from Rim to Invert	Size	Material Type	Saamis Dr and 20th St
	A 2.67	800	PVC	SE
Sanitary ☒ Storm ☐	B 2.78	800	PVC	
Material	C			
Rim Elev 725.592	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



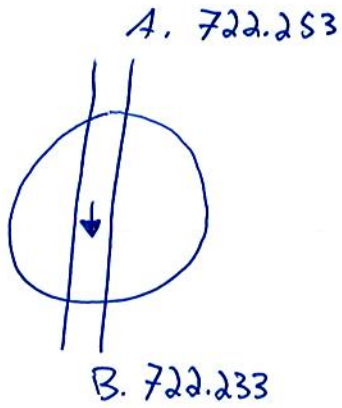
Manhole	Pipes			Location
Number E874	Depth from Rim to Invert	Size	Material Type	2nd MH South of Saamis Dr
	A 2.69	800	PVC	in west ditch along 20th
Sanitary ☒ Storm ☐	B 2.72	800	PVC	St SE. West line.
Material	C			
Rim Elev 725.355	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



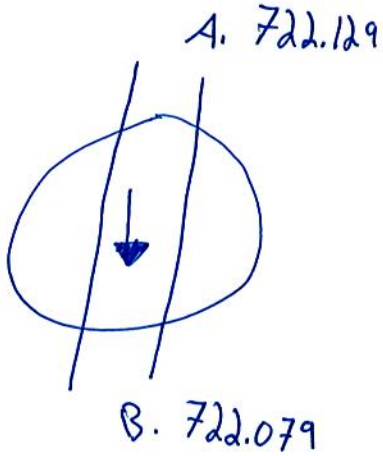
Manhole	Pipes			Location
Number D94C	Depth from Rim to Invert	Size	Material Type	2nd MH South of Saamis Dr
	A 1.60	300		in West ditch along 20th
Sanitary ☒ Storm ☐	B 1.66	300		St SE. East line
Material	C			
Rim Elev 724.326	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00

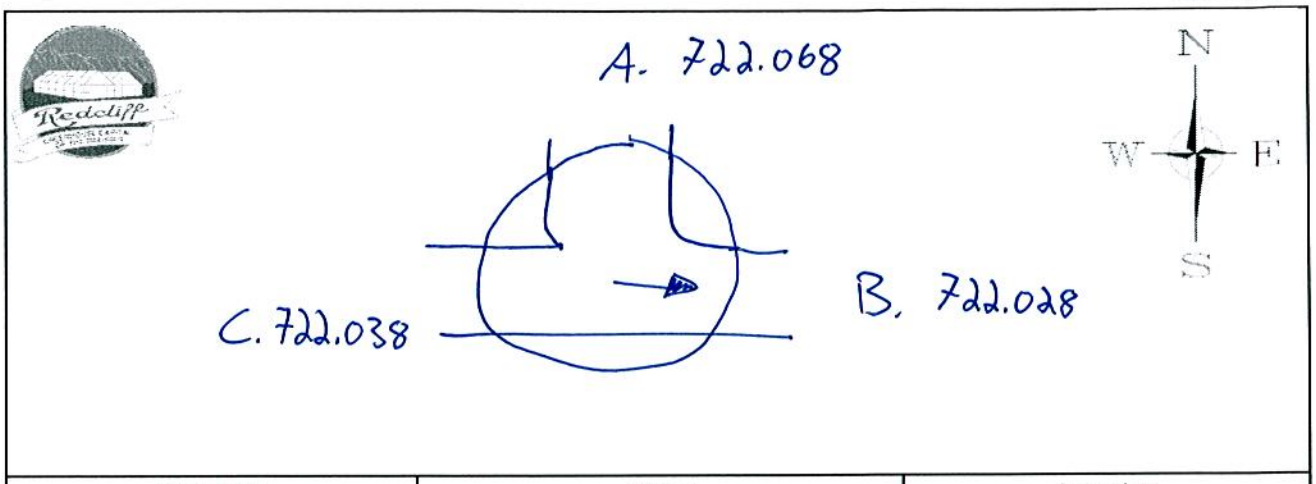


Manhole	Pipes			Location
Number E872	Depth from Rim to Invert	Size	Material Type	4th MH South of Saamis
	A 2.05	800	Pvc	Dr in West ditch along
Sanitary ☒ Storm ☐	B 2.07	800	PVC	20th St SE. West line.
Material	C			
Rim Elev 724.303	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

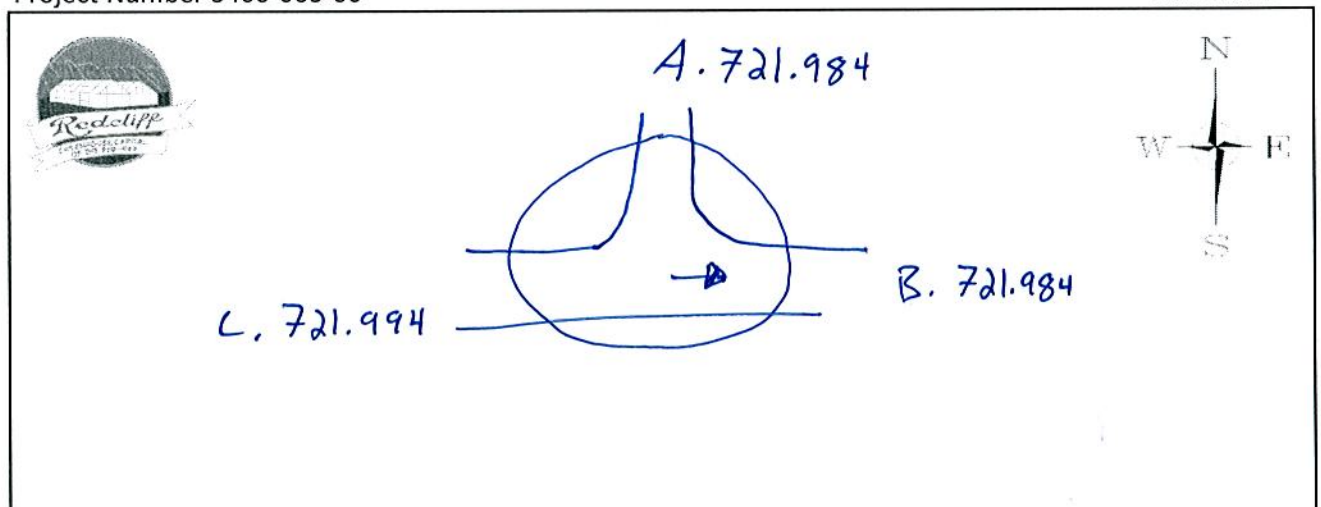
Town of Redcliff Wastewater/Sanitary System Evaluation 2012
Project Number 3400-003-00



Manhole	Pipes			Location
Number E871	Depth from Rim to Invert	Size	Material Type	5th MH South of Saamis Dr
	A 1.70	800	PVC	in west ditch along 20th
Sanitary ☒ Storm ☐	B 1.75	800	PVC	St SE. West line
Material	C			
Rim Elev 723.829	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson



Manhole	Pipes			Location
Number E86F	Depth from Rim to Invert	Size	Material Type	20 St SE where Redcliff
	A 2.30	800	PVC	line goes to City of Med. Hat.
Sanitary ☒ Storm ☐	B 2.34	400	VCT	West MH in West ditch.
Material	C 2.33	400	VCT	
Rim Elev 724.368	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson



Manhole	Pipes			Location
Number D949	Depth from Rim to Invert	Size	Material Type	20 St SE where Redcliff
	A 2.24	300	VCT	line goes to City of Med. Hat.
Sanitary ☒ Storm ☐	B 2.24	400	VCT	East MH in West ditch
Material	C 2.23	400	VCT	
Rim Elev 724.224	D			Date June 28, 2012
	E			By Blake Smith, Brad Erickson

TOWN OF REDCLIFF
REQUEST FOR DECISION

DATE: May 23, 2013

PROPOSED BY: Shanon Simon, Manager of Legislative and Land Services

TOPIC: Land Sale – Portion of 2nd Street SW

PROPOSAL: Consider selling a portion of 2nd Street SW to resolve encroachment issue.

BACKGROUND:

Tri-Ventures recently submitted a development permit application for a greenhouse expansion on Lot 47, Block 34, Plan 1212279 (221 8 Street SW). The greenhouse has been constructed prior to being granted development permit approval. The application was taken to the Municipal Planning Commission meeting of May 15, 2013 and tabled as more information was required. One of the issues identified was that the structure extends into a portion of 2nd Street SW.

One of the suggested resolutions was for Tri-Ventures to purchase a portion of 2nd Street SW. Alternatively Tri-Ventures could remove a portion of the structure.

Attached is a letter of request from Tri-Ventures asking for Councils consideration to purchase a portion of the 2nd St. SW. Mr. Wagenaar is proposing to purchase the portion of land that the structure is encroaching onto plus the required setback. This area would equal 40.75 m^2 (.01 acres). To expand the greenhouse Mr. Wagenaar purchased a portion of 2nd Street SW previously. Using the same pricing the cost of the land would be $350.52.

I would suggest that if consideration is given to selling a portion of the roadway that it be for the entire width of the roadway so as not to create an odd shaped roadway, albeit the roadway is not physically built. This area would equal 171.02 m^2 (.04 acres) and the cost using the previous pricing would be $1,402.06.

If this request is granted it would be necessary to close a portion of the roadway via the road closure process as well to consolidate that portion of roadway with Lot 47, Block 34, Plan 1212279.

OPTIONS:

1. Authorize the sale of a portion of 2nd St. SW 40.75 m^2 (.01 acres) to Tri-Ventures in the amount of $350.52 plus GST conditional to

    a) passage of a Road Closure Bylaw by the Town; all costs to be the responsibility of the Purchaser.

    b) approval for and registration of a consolidation plan consolidating the portion of the closed roadway with Lot 47, Block 34, Plan 1212279; all costs to be the responsibility of the purchaser.

2. Authorize the sale of a portion of 2nd St. SW 171.02 m^2 (.04 acres) to Tri-Ventures in the amount of $1,402.06 plus GST conditional to

   a) passage of a Road Closure Bylaw by the Town; all costs to be the responsibility of the Purchaser.

   b) approval for and registration of a consolidation plan consolidating the portion of the closed roadway with Lot 47, Block 34, Plan 1212279; all costs to be the responsibility of the purchaser.

3. Deny the request from Tri-Ventures dated May 23, 1013 to purchase a portion of 2nd Street SW.

RECOMMENDATION:

It would be my recommendation to select either Option 2 or 3.

SUGGESTED MOTION(S):

1. Councillor _____ moved to authorize the sale of a portion of 2nd St. SW 40.75 m^2 (.01 acres) to Tri-Ventures in the amount of $350.52 plus GST conditional to

   a) passage of a Road Closure Bylaw by the Town; all costs to be the responsibility of the Purchaser.

   b) approval for and registration of a consolidation plan consolidating the portion of the closed roadway with Lot 47, Block 34, Plan 1212279; all costs to be the responsibility of the purchaser.

2. Councillor _____ moved to authorize the sale of a portion of 2nd St. SW 171.02 m^2 (.04 acres) to Tri-Ventures in the amount of $1,402.06 plus GST conditional to

   a) passage of a Road Closure Bylaw by the Town; all costs to be the responsibility of the Purchaser.

   b) approval for and registration of a consolidation plan consolidating the portion of the closed roadway with Lot 47, Block 34, Plan 1212279; all costs to be the responsibility of the purchaser.

3. Councillor _____ moved to deny the request from Tri-Ventures dated May 23, 1013 to purchase a portion of 2nd Street SW.

SUBMITTED BY: Simon _____ Department Head _____ Municipal Manager

APPROVED / REJECTED BY COUNCIL THIS _____ DAY OF _____, 2013.

Tri-Ventures

Box 287
Redcliff, AB T0J 2P0
502-3035 Wayne/952-3171 Rick

May 23, 2013

To Whom It May Concern:

Please consider our application to purchase the piece of land circled on drawing. We are asking for the purchase of land plus the applicable land for setbacks.

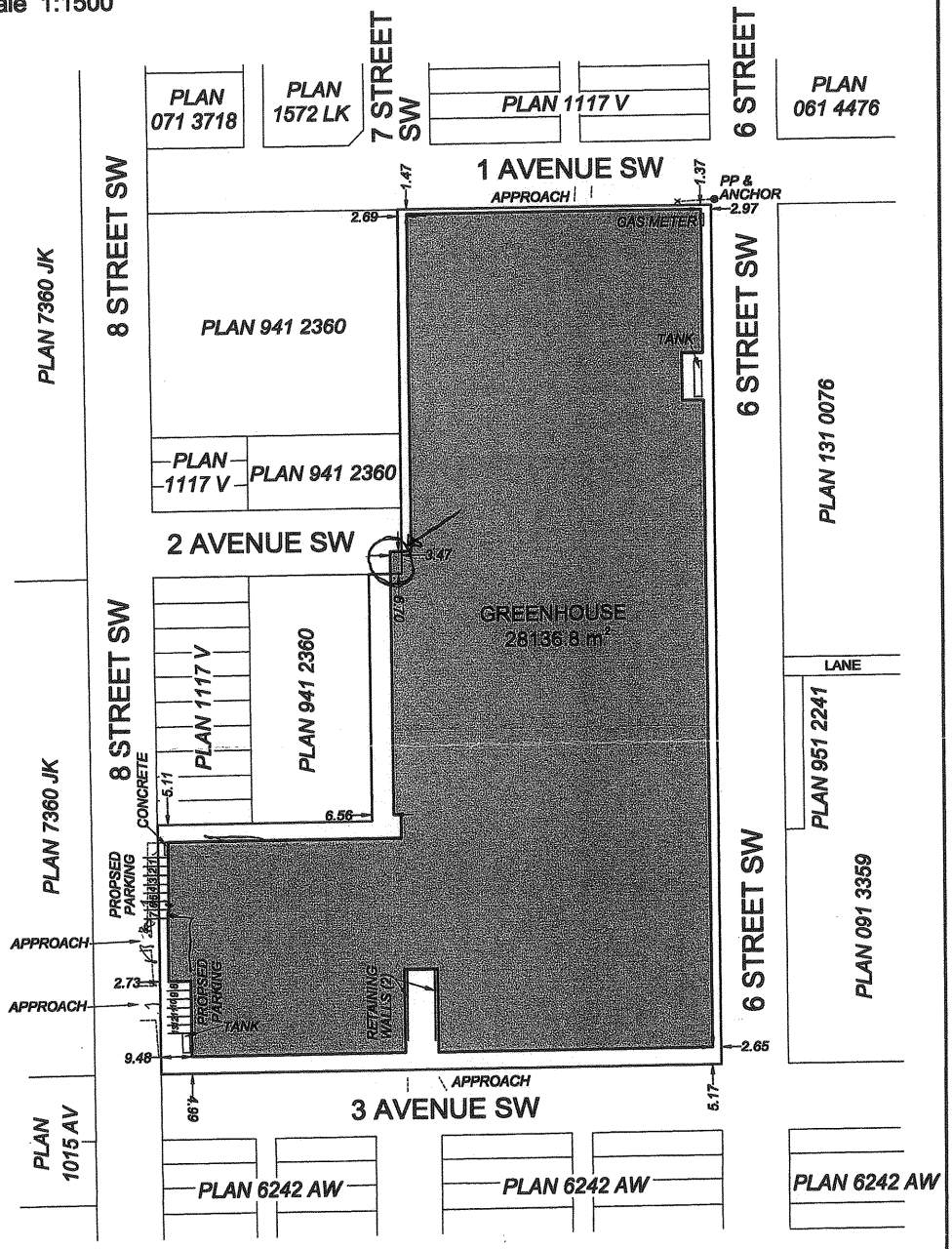
Our reasons: When the greenhouse that is on the stated property was planned and built, an oversight of greenhouse size for the land owned, and town purchased land (2nd Ave SW) existed. Communication between land owner (Tri Ventures) and contractor missed these items. We feel the purchase of a bit more land would be easier than taking down the existing greenhouse, considering we own all adjacent property but one, (Fishers). We would be responsible for all fees. We would appreciate your consideration in this matter, or if you had an alternative idea that was less expensive, but applicable. We would appreciate your thoughts.

Thanks for your time.

Rick Wagenaar
Tri Ventures

PROPOSED PARKING PLAN

Legal Description: Lot 47, Block 34, Plan 121 2279
Date: March 18, 2013
Scale 1:1500



Benchmark Geomatics Inc.
Unit 105, Westside Common
#2201 Box Springs Boulevard NW
Medicine Hat, AB T1C 0C8
Phone (403)527-3970 Fax (403)527-3908

FILE NO. 13020078

DRAWN BY: AJT/CLF

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