SELKIRK HOTEL DEVELOPMENT
IN FORT EDMONTON PARK
SERVICING ASSESSMENT REPORT

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SELKIRK HOTEL – FORT EDMONTON PARK
Servicing Assessment Report

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1.0 INTRODUCTION

It is proposed to reconstruct a historic Edmonton Hotel (Selkirk Hotel) at the northeast corner of the intersection of 1905 Street and 1920 Street in Fort Edmonton Park. The front of the building will be the southwest face on 1920 Street.

The building will be three stories high with no basement. It will have 30 guest-rooms with a maximum expected occupancy in the order of 70 persons. It will include Johnson's Café and Bar, to serve food and refreshments to both hotel occupants and park visitors. The footprint of the building will be approximately 7,730 square feet.

2.1 STUDY SCOPE

The scope of this study is limited to sanitary sewerage, stormwater drainage, domestic water and fire protection systems required to support the development of the Selkirk Hotel in Fort Edmonton Park.

1.2 STUDY METHODOLOGY

This study has been completed by Brian Thompson, P.Eng., as a Subconsultant to Gibbs and Brown Landscape Architects Ltd. Gibbs and Brown are acting on behalf of the City of Edmonton Community Services Department and are responsible for an environmental review of the project, which review includes a transportation / parking review and a review of the water and sewer servicing requirements.

The Terms of Reference for the Gibbs and Brown assignment include the requirement to address the issue of "existing (sanitary) drainage capacity at the Fort and in the service area, and capacity requirements specific to this project. With respect to capacities, there are two options:

- Maintain existing pump discharge rate and provide additional storage; or

- Evaluate downstream sanitary system and modify the existing pump/storage system in the park accordingly."

In order to perform the assessment of the sanitary, stormwater and water systems, we have consulted with the following City of Edmonton personnel:

- Sid Lodewyk, P.Eng. – AMPW - Drainage Services
- Maurice Boisvert, C.E.T. – AMPW - Drainage Services
- Michael Porretta – AMPW - Drainage Services
- Ron Wheeler – Community Services
- Wayne Simmons – Community Services
- Bill Demchuk – Community Services
- Stephen Poole, P.Eng. – EPCOR Water Services
- Don Pilling, P.Eng. – Edmonton Fire Department
- Bill Follett & Kelly Millen – AMPW – Energy Management

These personnel have been very helpful in providing information about these systems. That information has been used to evaluate the systems, and to prepare the report which follows.

2.2 ASSESSMENT OF SANITARY SEWERAGE

2.3.1 Description of Existing System

There is an existing 250 mm (10") diameter gravity sewer along 1905 Street, which drains into an existing 250 mm gravity sewer which then drains easterly along 1920 Street past the Ukrainian Book Store and the Sun Drug Store. This sewer is then drained by a 250 mm pipe running south to a sewage lift station located beside the J. B. Little building.

This sewage lift station is a Wet Well / Dry Well type with two sewage pumps located in the Dry Well. The pumps discharge sewage via a 150 mm (6") forcemain up the slope of the North Saskatchewan River Valley where it discharges into an existing 250 mm gravity sewer in Brander Gardens (Riverbend) subdivision.

The lift station has overflow protection via a connection to an adjacent storm sewer, plus an overflow storage tank. The function of the overflow storage tank is to reduce the likelihood of the lift station overflowing into the storm system during storm events or power outages, because that storm sewer would convey the raw sewage directly to the river.

2.3.2 System Capacities

A 250 mm diameter gravity sewer at a minimum slope of 0.28% has a flow capacity of 0.031 cubic meters per second (cms). In residential service, this capacity would be designed to accommodate:

- Wet weather extraneous flows of 0.0003 cms/ha.
- Average daily per capita flow of .000004 cms (350 L/cap/day)
- Peak Dry Weather flow = 4 x Average flow
- Approximately 33 gross hectares of residential area could be serviced at a density of 40 persons per gross hectare.
- The equivalent residential population capacity of the 250 mm sewer is approximately 1300 persons (at 350 L/cap/day).

In Brander Gardens subdivision, there are 31 lots served by the 250 mm sewer upstream of the point where the Fort Edmonton Park forcemain discharges into it. At a population of 2.9 persons per house, the population contributing at this point would be about 90 persons. 90 persons = 6.9% of 1300 persons.

The proposed Selkirk Hotel will have a maximum occupancy of 70 persons, plus park users will presumably use restroom facilities associated with Johnson's Café in the Hotel, so the total contributing population for sanitary sewage generation will also be in the order of 90 persons.

90 persons at 350 litres per capita per day contribution would generate at total of 0.00036 cms average dry weather flow.

The sewage lift station (City Station 101) has a wet well inside diameter of 6.5 feet or 1.981 meters. The lead pump turns on at a 5 foot depth and shuts off at a 3 foot depth. In 1991, this lift station was upgraded by replacing the original Smart Turner pumps with new Flygt pumps. This replacement was likely a result of a 1986 incidence of the pumps being flooded and hence out of service for some time. Since the system depends upon the pumps being able to cycle on and off in accordance with the volume of sewage entering the system, Fort Edmonton Park facilities would have to be shut down during any prolonged period of pump failure. In 2000, the lift station was once again upgraded by replacing most of the valves and piping in the station.

Each of the Flygt Model CT3170 pumps has a capacity of 190 USGPM (0.012 cms) at 136 foot (41.5 m) total dynamic head, and each is powered by a 30 HP electric motor.

The volume of sewage discharged by the pump can therefore be calculated to be 1.88 cubic meters or 66.33 cubic feet if there was no inflow to the lift station during the period, and the pump would be on for about 2.6 minutes if it discharges at 0.012 cms.

If the 250 mm pipe coming in to the lift station was flowing full (but not surcharged) in a wet weather situation, then .031 cms would be entering the station. Since this exceeds the pump output capacity of .012 cms, then the level in the station wet well would continue to rise. This would, at a depth of 5.1 feet, trigger the second sewage pump to turn on, and both pumps would work together to pump sewage up the hill to the Brander Gardens system. The second pump would shut off when the level in the wet well was pumped down to a 3.2 foot depth.

If the inflow was such that both pumps could not keep up (a severe storm), or if one or more pumps was out of service during a storm event, then the level in the wet well and the adjacent 43.5 cubic meter storage tank might continue to rise to the 8 foot depth, at which time it would overflow into the nearby storm sewer.

2.3.3 Quantity of Sewage

Attendance and function booking records for Fort Edmonton Park show that park visitors peak during July and August weekends. Often the May long weekend and Harvest Fair weekend produce the highest daily attendance for the year:

Table 1-1

RECORDED PEAK DAILY ATTENDANCE AT FORT EDMONTON PARK

YEAR	MAY LONG WEEKEND	HARVEST FAIR
1999	7,508	6,244
2000	5,991	4,339
2001	7,367	7,802

Functions at various facilities in Fort Edmonton Park are usually in the evenings, and the busiest time of the year is the November – December Christmas party season, although there can be functions in the Park at any time. During this heavy-use period, there could be 2,000 persons in the park at one time.

Water use by attendees at functions, or park users in general, will be in washrooms. In order to estimate the amount of water used and sewage generated by the various types of park users, we have examined the relationships between pump clock readings, park attendance records and water use records.

The park attendance records show users in three categories, and we have looked at the numbers for 1999, 2000 and 2001:

- Gate – Paid attendance by those passing through the Railway Station entrance varies from zero in the winter months to a peak of around 37,000 in July and August. Total average annual number of Gate users for the three-year period was approximately 127,500.
- Program – Attendance by program users (schools, etc.) varies throughout the year with monthly figures ranging from 100 to 4,000. Total average annual number of Program users for the three-year period was approximately 15,100.
- Rental – Attendance at rental facilities within the Park (Egges Barn, Blatchford Hangar, etc.) varies with monthly figures as low as 1,500 and as high as 11,800. Total average annual number of Rental users for the three-year period was approximately 61,100

Actual water use data for Fort Edmonton Park was only available for study purposes for the year 2000. The following table illustrates the relationship between water use, attendance and sewage pump output for 2000:

Table 1-2

Water Use, Attendance and Sewage Pumping Relationships

Month	Litres of Water Used	Total Attendance	Litres Per Capita	Pump Clock Hrs.	Discharge Rate L/s
January	600,000	2,713	221	10.125	16.5
February	410,000	4,534	90	10.533	10.8
March	399,000	3,346	119	12.666	8.8
April	411,000	7,244	57	12.167	9.4
May	771,000	19,847	39	20.686	10.4

Month	Litres of Water Used	Total Attendance	Litres Per Capita	Pump Clock Hrs.	Discharge Rate L/s
June	1,693,000	38,775	44	22.171	21.2
July	1,787,000	48,630	37	24.490	20.3
August	1,988,000	43,430	46	27.618	20
September	842,000	13,474	62	22.171	10.5
October	533,000	9,758	55	13.692	10.8
November	431,000	2,850	151	12.036	9.9
December	422,000	10,860	39	10.962	10.7
Totals	10,287,000	205,461	50	199.317	14.3

The January and November calculated L/cap numbers are higher than would be expected. One possible reason for some of the variations, both high and low, would be due to the fact that water meter readings are not taken at the end of each month, in fact they are likely taken every second month and estimated every second month.

We know that the rated capacity of each sewage pump is 12 L/s, which indicates that the calculated pump discharge rate for January, June, July and August are much higher than would be expected. In the case of the January number, it is likely that the meter reading actually includes water used in the previous December where there is typically high attendance at functions in the park. In the case of the June, July and August numbers, we suspect that outdoor uses such as watering flower beds, gardens and some lawns should be subtracted from the water use because it does not go into the sewer and through the lift station. Note that we did exclude water used by the steam engine at the water tower in the tabulated water use numbers for that same reason.

If we make the simplified assumption that the sewage pump puts out 158 IGPM or 12 L/s. when it is running, then it is possible to convert the monthly pump clock readings to sewage flow, and then sewage flow can be related to monthly attendance records. The following table illustrates these relationships:

Table 1-3

Attendance and Sewage Pump Relationships

Month	Pump Clock Hours	Total Litres Pumped	Total Avge. Attendance	Approximate Litres/capita
January	9.1875	396,900	3,211	124
February	9.9567	430,132	4,901	88
March *	14.2043	613,624	3,223	190
April	12.4129	536,626	7,125	75
May	17.3490	749,479	19,399	39
June	21.0533	909,504	36,780	25
July	25.1881	1,088,125	43,701	25
August	27.5653	1,190,823	45,331	26
September	20.1679	871,251	15,878	55
October	13.6917	591,480	9,081	65
November **	14	604,800	4,741	128
December	15.3484	663,051	10,445	63
Totals		8,645,795	203,816	42

* Note that the March number for litres pumped per capita is high. This may be due to inflow into sewers during spring melt period.

** Note that pump readings were not reliable in November, 2001, and so this number is an estimate of a realistic pump clock number for that month. However, it produces a per capita number which is suspect on the high side.

It becomes clear that there is a large difference in per capita sewage flow between summer and winter months. In the summer months, the dominant attendance (up to 85%) is through the gate. In the winter months, the dominant attendance (up to 80%) is in the rental facilities. It is likely that the different types of Park users use the washroom facilities in very different ways. It is also likely that children make up a significant number of the Gate users, whereas almost no children would be among the Rental facility users. Program users are likely to be students at the Junior High level.

The following table illustrates a possible, but not the only, scenario of the various contribution rates:

Table 1-4

Breakdown of Sewage Contributions by User Types

Month	Gate Visitors @ 8.5 L/cap	Program @ 80 L/cap	Rental @ 100 L/cap	Total Litres	Approximate Litres/capita
January	0	52,960	254,900	307,860	96
February	13,334	65,973	250,733	330,040	67
March	17	103,493	192,767	296,277	92
April	28,339	127,747	225,667	376,752	53
May	104,159	151,893	524,667	780,719	40
June	204,544	274,720	928,200	1,407,464	38
July	313,695	44,667	623,733	982,095	23
August	306,448	53,573	860,900	1,220,921	27
September	69,442	43,680	716,267	829,389	52
October	36,267	105,547	349,467	491,280	54
November	0	92,560	358,367	450,927	95
December	7,817	98,000	830,033	935,851	90

Note that the approximate L/cap numbers in this table correspond fairly well with the approximate L/cap numbers in the previous table, with a tendency to be slightly lower. They are lower, because the previous table, based on pump clock readings, would include inflow and infiltration into the sewer system, plus the contribution of any leaking toilets and faucets, or any faucets left in the open position.

2.3.4 Historical Performance of Existing System

In our discussions with City of Edmonton Drainage Services personnel, who are charged with the responsibility of operating this system, we learned the following:

- There have been no recorded incidents of surcharging in the Brander Gardens sewage system, nor does the computer model indicate any problems in this system even under the most extreme recorded wet weather conditions.

- There have been several recorded incidents of the Fort Edmonton Park sewage lift station overflowing into the storm system and the river at Outfall #14 during wet weather events. These incidents resulted in the overflow storage tank being built beside the lift station in 1989. Since that tank was constructed, the station has overflowed in only the most severe storms.

- The dry weather performance of the system is good, and the anticipated contribution of the Selkirk Hotel should be well within the existing capacity of the Fort Edmonton Park lift station. For example, the anticipated average daily flows from the fully-occupied hotel could be pumped by one of the two pumps in a 44 minute period.

- Because the historical problems with the system have been related to wet weather flows, it would be prudent to focus on the elimination of situations where surface runoff might be able to enter the sanitary sewer system. That focus leads to an assessment of the stormwater drainage system.

1.4 ASSESSMENT OF STORMWATER DRAINAGE

While the majority of the area occupied by Fort Edmonton Park is served by a surface drainage system consisting of swales, ditches and natural sloughs or ponds, the developed portions of the site are served by underground storm sewers. One system serves the area from the west end of 1885 Street to the John Janzen Nature Centre. This system has pipes ranging in size from 200 mm to 1050 mm at the outlet to the North Saskatchewan River north of the Fire Hall.

As part of this system there is a 900 mm storm sewer along 1920 Street, which drains in a westerly direction and which leads to Outfall # 14 to the North Saskatchewan River. There are two catchbasins in the intersection of 1920 Street and 1905 Street which are connected to this storm sewer.

The overflow from the sewage lift station and storage tank are connected to this 900 mm storm sewer via a 600 mm connection. Since this piping arrangement will convey raw sewage directly to the North Saskatchewan River, at a point which is located upstream from the intake to the Rossdale Water Treatment Plant, it is desirable to minimize or eliminate the lift station overflow events.

The existing ground at the proposed location of the Selkirk Hotel is quite flat, in the range of elevation 626.3 to elevation 626.7. The general slope of the ground is towards the west onto the extension of 1905 Street, which in turn slopes towards the north and drains into the ditch beside the main service road. There is an existing ditch along the north edge of 1920 street which is drained by a catchbasin at the northeast corner of the 1905 Street / 1920 Street intersection. At some point in the future, it is proposed to eliminate this ditch and to develop an urban crossection for 1920 Street, including the intersection with 1905 Street. This proposed urbanization will necessarily impact the proposed grading of the Selkirk Hotel development. The likely impact will be to raise the main floor elevation of the building relative to what it might be if the urban crossection was never going to be adopted.

A stormwater retention area has been developed to the east of the Selkirk Hotel site south of Blatchford Hangar.

Both the 900 mm pipe and the stormwater retention area are potential recipients for stormwater discharges from the new Selkirk Hotel development, in addition to surface drainage onto the 1905 Street extension along the west side of the Hotel.

1.5 ASSESSMENT OF WATER SYSTEM

The water system in Fort Edmonton Park consists of a 200 mm diameter looped watermain with fire hydrants. One end of this loop connects to the distribution system in Brander Gardens and the other end connects to the distribution system in Grandview Heights. Because the park is in the river valley, and is fed from the system at the top of the valley, pressures in this water loop are relatively high, in excess of 550 Kpa (80 psi). This pressure is sufficiently high as to require the service connection to the Selkirk Hotel plumbing system to be protected by a pressure reducing valve. The mechanical designer for the hotel should take this matter into account and provide accordingly.

However, a 200 mm diameter main which has a such a long length, has high friction losses when it is tasked to provide a fire flow. For example, the City of Edmonton design standards require a fire flow of 300 litres per second (4,755 USGPM) for high value properties (including school, institutional, commercial / industrial sites) and 180 litres per second (2,853 USGPM) for multi-family residential areas. The 300 L/s requirement could only be met with a flow of 150 L/s coming from either end of the 200 mm main, which would result in a velocity of 5 meters/second and head losses in the order of 100 meters per 1000 meters of main. This is not an achievable amount, and the velocities are too high to meet design standards. The 180 L/s requirement could theoretically be met with flows of 90 L/s coming from either end, which would result in a velocity of 3 m/s (acceptable) and friction losses of less than 50 meters per 1000 meters of pipe. This flow is considered to be achievable.

Information provided by EPCOR Water Services Inc. shows that a hydrant flow test in the Park (Hydrant #6401) with two – 2.5” nozzles flowing yielded 129 litres per second (2,045 USGPM) with a residual pressure of 400 Kpa (57 psi).

The Selkirk Hotel will be a fully sprinklered facility, which if fully activated, would require a flow of 98.5 L/s (1,560 USGPM). Since the sprinkler system is zoned, and only activates in an area of fire, then full activation at the above amount would mean the whole building is on fire, and would likely be a total loss. A more likely scenario is a fire in one zone requiring 25% or less than the fully activated amount.

A Fire Department pumper truck has a maximum output of 114 L/s (1,800 USGPM) and one aerial nozzle on a ladder truck has a capacity of 44 L/s (700 USGPM).

It would appear that the Fort Edmonton Park water system does have capacity to fight a fire in the building, as long as it does not get out of control. If the entire structure becomes engaged, then the system would be taxed to the maximum.

It should be noted that the 300 L/s standard would be applicable if there were other buildings immediately adjacent to the proposed Selkirk Hotel. What this means is that if Fort Edmonton Park expands in a manner which places buildings very close to each other, then the fire protection system which currently exists in the park is deficient.

This deficiency in the Fort Edmonton Park water system is of long standing. The Fort Edmonton Park Master Plan sets out deficiencies in the fire protection system in Section 4 a) iv) Fire Protection Requirements. These documented deficiencies relate to hydrant accessibility, hydrant spacing and sprinkler systems in buildings.

Fire hydrants connected to the main on 1905 Street are located near Ross Brothers Hardware, Rutherford House and the Fire Hall. The main then turns east and runs to the Melon Farmhouse. Hydrants are also located near the Ukrainian Bookstore and the Melon Farmhouse. A 200 mm branch from this main serves two fire hydrants and the Ramsey Greenhouse. The spacing of these hydrants exceeds the maximum allowable (City of Edmonton Design Standards) of 90 meters (300 ft.) for industrial/commercial areas.

As a result, this main and the hydrants cannot provide the level of fire protection that would be expected in the downtown area of the City, but it can provide adequate protection to the proposed Selkirk Hotel if it is a stand-alone building with no other immediately adjacent buildings.

The fact that people will now be sleeping overnight in a building on this site makes any deficiencies in the fire protection system more critical than it has been in the past.

Potential loss of property is a serious matter, but potential loss of life is much more serious. This may have an impact on the Fort Edmonton Park Risk Management Plan, and on insurance coverage and premiums.

1.6 GENERAL OBSERVATIONS

As stated in Section 1.2, the Terms of Reference for the Gibbs and Brown assignment include the requirement to address the issue of "existing (sanitary) drainage capacity at the Fort and in the service area, and capacity requirements specific to this project. With respect to capacities, there are two options:

- Maintain existing pump discharge rate and provide additional storage; or
- Evaluate downstream sanitary system and modify the existing pump/storage system in the park accordingly."

Our evaluation of the sewage system at Fort Edmonton Park has concluded that the previous problems associated with the lift station storage and sewage pumps have all been related to wet weather conditions, and have very little to do with dry weather sewage flows, such as will be generated by the proposed Selkirk Hotel. We have concluded that the existing system has sufficient dry weather capacity to support the development of the Hotel without modification to the pumps or the storage tank.

Therefore, we believe that the focus should be on the surface drainage system, and the potential for eliminating or minimizing any incidents of runoff entering the sanitary system through manholes, or any other cross-connections with the stormwater system.

It also appears that deficiencies in the water system relating to fire protection should now be given more serious consideration, because an occupied hotel presents an increased risk to the safety of people as compared to the existing condition in the park where buildings are not occupied at night.

SECTION 2.0
RECOMMENDED SERVICING FOR SELKIRK HOTEL DEVELOPMENT

2.1 INTRODUCTION

In Section 1, sewer, water and drainage servicing constraints relating to the potential development of the Selkirk Hotel in Fort Edmonton Park have been documented. Given those constraints, this Section sets out some alternatives for providing an appropriate level of service for this development.

2.2 SERVICING ALTERNATIVES

2.3.1 Sanitary Service Option #1 – Gravity Connection

A 150 mm diameter service connection could be installed across 1920 Street connecting directly into the existing 250 mm sanitary sewer. This connection would have to be installed under the two sets of streetcar tracks along the centre of the street. In order to minimize disturbance to the existing surface and to Park operations and users, it would be appropriate to install this service connection by auguring or coring techniques. Excavated working pits would be required at each side of the street.

2.3.2 Sanitary Service Option #2 – Pumped Connection

A small lift station could be built to provide sanitary service to the hotel only. It could be located outside and behind the hotel, or it could be located in the crawl space under the building. Duplex pumps would pump hotel sewage across the street to the existing 250 mm sewer via a 100 mm forcemain connection. This connection would have to be installed by auguring or coring techniques similar to the gravity connection.

The wet well of this dedicated lift station could be sized to provide a certain amount of storage volume. This opportunity to store sewage could be used to advantage during wet weather events, which tend to overload the main lift station. This would be one way of ensuring that this development does not exacerbate an existing problem.

2.3.3 Storm Service Option #1 – Direct Connection to Storm Sewer

A 250 mm or 200 mm diameter service connection could be installed across 1920 Street connecting directly into the existing 900 mm storm sewer. This connection would have to be installed under the two sets of streetcar tracks along the centre of the street. In order to minimize disturbance to the existing surface and to Park operations and users, it would be appropriate to install this service connection by augering or coring techniques. Excavated working pits would be required at each side of the street.

Roof runoff water could be directly connected through this connection, or alternatively it could be discharged to the surface near the building where it could be directed to a catchbasin or catchbasins connected to the storm service.

2.3.4 Storm Service Option #2 – Surface Discharge

It is possible, that by carefully designing the grading of the area, most or all of the runoff from the building roof and adjacent roadways could be directed either towards the storm retention area near Blatchford Hangar or to 1905 Street along the west side of the Hotel. This would eliminate the need for a direct connection to the 900 mm sewer, but it would require some ditching and culvert installation works in the vicinity of the wooden walkway to Blatchford Hangar.

2.3.5 Water Service Option #1 – Connection to Existing 1920 Street Main

The service connection to the Selkirk Hotel from the existing 200 mm watermain in 1920 Street will provide for both domestic supply and sprinkler system supply. This dual-purpose service connection would likely be a 150 mm diameter pipe, and there would be a valve on the service line.

As mentioned earlier, due to the high pressures in the watermain in this area, the Mechanical Designers should give due consideration to the matter of providing a pressure reducing valve to protect the building plumbing from the high pressures.

We also suggest that the one hydrant located across 1905 Street will be insufficient to properly protect the exterior of this building, so an extension of the watermain easterly along 1905 Street towards the service road, with a hydrant appropriately located across 1905 Street from the new hotel will be a minimum upgrading to the current system. This extension serving one new hydrant could be 150 mm.

The following sections set out two additional longer term water system upgrading alternatives for consideration.

2.3.6 Water System Upgrading Option #1 – Reservoir and Pumphouse

One method of strengthening the water system in Fort Edmonton Park would be to construct a new water storage reservoir with an associated pumphouse containing fire pumps. The reservoir would be sized to provide a sufficient volume of water to fight a fire of say two hours duration (2 hrs. x 60 min. x 60 sec x 300 L = 2.2 ML). The fire pumps would be designed to automatically turn on and boost pressure in the system only if pressure in the system dropped to a pre-established level. A facility like this could be constructed at an inconspicuous location such as behind the Post Office, Bank of Montreal, Ukrainian Book Store and Sun Drugs, or even behind the new Hotel. Other, similar locations should be considered as well.

The storage reservoir could be constructed as a below-grade concrete tank (a rectangular or square box shape). The pumphouse would likely sit on top of one corner of the reservoir. The pumphouse superstructure might be of a size comparable to a typical single-car garage.

Proper location, sizing and costing of the reservoir, pumps and pumphouse require additional study, which are currently beyond the scope of this study.

2.3.7 Water System Upgrading Option #2 – New Feeder Main from 148 Street

The main problem with the current water system is the long length of 200 mm main required to deliver fire flows to a hydrant or hydrants during a fire. The intersection of 1920 Street and 1905 Street is approximately 875 meters away from the point where the 200 main connects to the Brander Gardens distribution system. It is even farther away from the point where it connects to the Grandview Heights system. If hydrants located near this intersection were required to deliver 300 Litres per second, then roughly half of that amount (150 L/s)would have to be drawn from each end of the 200 mm loop. For a 200 mm main, that means high velocities (5 m/s) and high friction (and corresponding pressure) losses.

A single-hydrant flow test produced a flow of 129 L/s, and the total flow from two hydrants might produce in the order of 200 L/s, which would be deficient. One way of making up this deficiency might be to provide another feeder main from the Brander Gardens system. A suggested location for this new feeder main would be in the vicinity of the location of the sewage forcemain, since that area of the hillside has previously been disturbed, and the construction technique for a watermain is very similar to construction of a forcemain. That would mean connecting into the distribution system in the vicinity of 148 Street and 66 Avenue. The suggested size for the new feeder would be 200 mm diameter, and it would come down the hill and connect into the existing 200 mm loop at an appropriate location along 1920 Street.

This option would require computer modeling to determine if this would provide a sufficiently increased level of protection to the buildings in Fort Edmonton Park, and more specifically to the proposed Selkirk Hotel.

Such modeling is beyond the scope of this study.

2.3 COST ESTIMATES

Note that the following estimates are intended for comparison purposes between alternatives only. They are preliminary and incomplete and should not be used for budgeting purposes without further refinement and an allowance for engineering and contingencies.

2.3.1 Sanitary Service Option #1 – Gravity Connection

28 Lin. M. 150 mm pipe @ $50 =	$ 1,400	
Additional for Auguring @ $300 =		$ 8,400
Connection to Existing Sewer @ $2,500 =		$ 2,500
Total		$12,300

2.3.2 Sanitary Service Option #2 – Pumped Connection

Grinder Pump Package in Basement @ $5,000 =		$ 5,000
28 Lin. M. 100 mm pipe @ $40 =	$ 1,120	
Additional for Auguring @ $250 =		$ 7,000
Connection to Existing Sewer @ $2,500 =		$ 2,500
Total		$15,620

2.3.3 Storm Service Option #1 – Piped Connection

27 Lin. M. 250 mm pipe @ $65 =	$ 1,755		
Additional for Auguring @ $300=		$ 8,100	
Connection to Existing Sewer @ $2,500 =			$ 2,500
Total		$12,355	

2.3.4 Storm Service Option #2 – Surface Drainage

65 Lin. M. Ditching @ $25 =	$ 1,625
5 Lin. M. 300 mm Culvert @ $100 =	$ 500
Total	$ 2,125

2.3.5 Water Service Option #1

39 Lin. M. 150 mm pipe @ $170 =	$ 6,630
2 x 150 mm Gate Valves @ $1,500 =	$ 3,000
2 Connections to Existing Main @ $3,500 =	$ 7,000

Hydrant @ $ 4,000 =	$ 4,000
Total	$20,630

2.4 RECOMMENDED WORK PLAN

Provision of sewer, water and drainage infrastructure for the proposed Selkirk Hotel development in Fort Edmonton Park will involve works as described above. The recommended alternatives and suggested budget construction costs are as follows:

- Install gravity sanitary service connection $15,000
- Install surface drainage system $ 4,000
- Water service connection & fire hydrant $26,000
- Investigate Water System Improvements $ 3,000
- Total $48,000