

REGION OF OTTAWA-CARLETON
RÉGION D'OTTAWA-CARLETON

REPORT
RAPPORT

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DATE 25 May 1999

TO/DEST. Co-ordinator
 Planning and Environment Committee

FROM/EXP. Director, Engineering Division
 Environment and Transportation Department

SUBJECT/OBJET **RICHMOND SEWAGE PUMPING STATION AND
FORCEMAIN STUDY**

DEPARTMENTAL RECOMMENDATION

That the Planning and Environment Committee recommend that Council approve the recommendations as outlined in the May 1999 Environmental Screening Report for the above study, namely:

- 1. undertake capital works needed to permit the infrequent use of Richmond Lagoon Cell C for temporary storage of sewage flows as a contingency for the Richmond Pumping Station;**
- 2. carry out improvements to the 500 mm forcemain, including twinning where it crosses underneath the Jock River and construction of a new valve chamber;**
- 3. undertake modifications to the Richmond Pumping Station to permit pumping of Jock River water to the lagoons for the purposes of enhancing the Richmond Conservation Area;**
- 4. construct fencing around the Richmond Lagoon Cell C to address safety concerns;**
- 5. the Region and Township of Goulbourn enter into a joint use agreement for the Richmond Lagoon area;**
- 6. the Region decommission the old Richmond Pumping Station.**

EXECUTIVE SUMMARY

An improved contingency plan is required for the Richmond pumping station and forcemain. The plan is required under the following conditions:

- a forcemain break occurs;
- major forcemain maintenance is required; or
- flows from the Richmond sewage collection system exceed pumping station capacity as a result of extreme wet weather events.

The existing plan involves the use of trucks to haul sewage to the extent practical. However, in most cases, a discharge of sewage to the Jock River or other surface water body is required. It is estimated that contingency requirements occur on average once every two to three years.

A wide range of alternatives were considered including:

1. the “do nothing” option;
2. increased control of extraneous flows entering Richmond’s sewage collection system;
3. an underground tank for temporary storage of sewage;
4. use of the Richmond sewage lagoons for temporary storage of sewage;
5. a combination of options 3 and 4.

The “do nothing option” is not considered acceptable due to the risk to the natural environment. While it is recommended that the Township of Goulbourn continue to control extraneous flow, these efforts will only address one element of the problem over the long term as the Township’s sewer system is improved. The underground tank option was rejected primarily due to the extremely high costs involved in constructing a tank with adequate capacity.

The use of the Richmond sewage lagoons is the recommended solution for temporary storage because:

- more than adequate storage volume is available;
- only minor infrastructure upgrades are required;
- it was concluded that potential impacts on existing lagoon habitat were insignificant;
- mitigating benefits to the lagoon habitat are proposed or are inherent to the proposed solution.

A public open house was held, which indicated no wide-spread opposition to the proposed solution.

The Township of Goulbourn has indicated support for the proposal. Stakeholders associated with the management of the Richmond Conservation Area have a number of outstanding concerns which can only be addressed through the preparation of a joint-use agreement for the lagoon area and through continued consultation during the detailed design process.

The study resulted in a number of other recommendations to improve system reliability and to mitigate the impact of the proposal on the lagoons.

BACKGROUND

The Richmond Pumping Station and Forcemain Study was approved by Council in February, 1998 (CSEDC Report 2). Connelly McManus Engineering Ltd. was awarded a contract to undertake the study.

Sewage from the Village of Richmond flows to the Richmond Sewage Pumping Station and is pumped through a 13.5 km, 500 mm diameter, forcemain to Glen Cairn (Kanata). The local sewers in the Village of Richmond are owned by the Township of Goulbourn, and the pumping station and forcemain are owned by the Region. The intent of the study was to:

- prepare an improved contingency plan for the pumping station and forcemain;
- identify improvements to the pumping station and forcemain that would increase system reliability; and
- prepare a decommissioning plan for the old pumping station, which was used to pump sewage from the Richmond area to the Richmond Lagoons until 1983.

The contingency plan for the pumping station would be executed when:

- a forcemain break occurs;
- major forcemain maintenance is required;
- flows to the station exceed station capacity.

Three forcemain breaks have occurred since its commissioning in 1983. No major planned maintenance has been undertaken since the forcemain was commissioned, but the air valves on the forcemain are corroded and require immediate repairs. The forcemain will need to be emptied of sewage before this work can be carried out.

Under most conditions, significant excess pumping capacity exists at the pumping station (Normal dry weather flow to the pumping station is about 20 L/s on average.) However, during extreme wet weather events, peak flows can sometimes exceed the station capacity of 160 L/s. These high flow rates are due to excessive extraneous flows into the Goulbourn sanitary sewer system which continue to occur in spite of on-going efforts by the Township to upgrade their system. Through the Region's Flow Management Program, the Region will continue to work with Goulbourn to identify and control these extraneous flows.

It is estimated that contingency action is required once every two to three years on average. Under existing conditions, trucks are used to the extent possible to haul sewage to the Region's sewage treatment plant when there is a forcemain break, but typically a spill to the surface water environment will occur. When the pumping station capacity of the station is exceeded, a by-pass to the Jock River is required. The intent of the new contingency plan is to minimize the risk of sewage spills and bypasses to the Jock River.

Improvements to the pumping station and forcemain were to be identified as part of the study in order to increase system reliability. Such improvements would reduce the risk of system failures and the frequency at which the contingency plan would be required. Improvements to be examined were to include those which would provide low-cost capacity increments to offset the impacts of high rates of extraneous flow which are experienced during rare wet weather events.

The old Richmond Pumping Station which pumped sewage to the Richmond lagoons until 1983 was not properly decommissioned when the new pumping station and forcemain began operation. Under existing conditions, the old station is a potential safety hazard to the public.

DISCUSSION

The study was conducted in accordance with the requirements of the Class Environmental Assessment process and involved the following elements:

- evaluation of existing flow data, including events resulting in bypass to the Jock River;
- evaluation of critical dynamic pressures in the forcemain, pumping station characteristics and operational procedures;
- identification of system improvements;
- identification and evaluation of contingency options;
- preparation of conclusions and recommendations; and
- preparation of a decommissioning plan for the old pumping station.

ALTERNATIVES

A number of possible contingency plan alternatives were considered, resulting in the identification and evaluation of six main options:

1. The “do nothing” option

The do nothing option is unacceptable due to the risk to the surface water environment. A variation on this option was considered which involved use of trucks during extreme wet weather events. The evaluation considered the number of truck-hours that would be required to manage large volumes of sewage, and the residual risk to the Jock River should the trucks not be able to keep up with the flow. This option was found to be impractical due the potentially high costs and large number of trucks required, the disruption to local residents, and the impact on air quality due to truck emissions.

2. Extaneous flow control

Control of extraneous flows will not address the requirement for a contingency in the event of a forcemain break or a need for major forcemain maintenance. Nonetheless, it was recommended that Goulbourn Township continue its extraneous flow control efforts. These efforts will ultimately reduce the risk of sewage bypasses due to the resulting

decrease in flows during wet weather conditions. However, the degree to which the risk is reduced in the short term cannot be quantified.

3. Temporary storage of sewage flows in an underground storage tank

An underground storage tank sized to provide a significant reduction in the risk of by-pass to the Jock River was estimated to cost \$3.5 million, with significant additional costs if such a tank could not be located in the Jock River floodplain, adjacent to the pumping station. This option was rejected due to the extremely high cost to benefit ratio.

4. Temporary storage of sewage flows in the Richmond Lagoons

The Richmond Lagoons had been used from 1969 until 1983 to store and treat sewage from the village. The Ministry of the Environment approved the new pumping station and forcemain with the following provisions:

- an emergency bypass to the Jock River; and
- a connection to the lagoons for use in the event of a forcemain shutdown.

From 1983 until 1986 the lagoons were not required in response to a forcemain shutdown. While not formally decommissioned, the lagoons were subsequently turned over to the Township and incorporated into the Richmond Conservation Area. Evaluation of the Richmond Lagoon bypass option involved the following:

- an evaluation of the existing 200 mm forcemain linking the pumping station to the lagoons;
- a geotechnical investigation to verify the integrity of the lagoons;
- an evaluation of potential impacts of bypasses;
- an evaluation of the capacity of the lagoons.

It was found that, under existing conditions, only one of three lagoon cells (Cell C) has the integrity to hold sewage, but that one cell would have more than adequate capacity to store flow from the most extreme emergency considered possible. An evaluation of the potential impacts on habitat was undertaken by Jacques Whitford Environmental Ltd., who concluded that these impacts would not be significant.

The use of Richmond Lagoon Cell C was recommended as the best contingency plan alternative.

5. Temporary storage of sewage flows in storage tanks and the Richmond Lagoons

Following public consultation, it was suggested that small above-ground storage tanks be used for more frequent needs, while Lagoon Cell C be used for extreme events. This option was rejected primarily due to the lack of any certainty that the use of such tanks would reduce the frequency at which Cell C would be required, the high cost of such tanks, and the likelihood of concerns about above-ground sewage storage in the Village of Richmond.

CONSULTATION

The study was carried out to meet the requirements of Phases 1 and 2 of the Class Environmental Assessment process for Municipal Water and Wastewater Projects.

The study steering committee included representatives from the Region, the Ministry of the Environment, and the Township of Goulbourn. The Goulbourn representative on the committee also serves as Township staff support for the Richmond Conservation Area Subcommittee (RCAS). Several meetings were held with the RCAS to discuss the option of using the Richmond Lagoons for contingency purposes.

A public open house took place in the Village of Richmond on 27 January 1999 to describe the problem, the alternative solutions, and the study recommendations. A total of 21 people signed in at the open house, and a total of 5 questionnaires were completed. Of these, only 1 indicated clear opposition to the study conclusions. The results of the open house, which was well publicized and conveniently located, lead to the conclusion that there is no wide spread public opposition to the proposal.

Subsequent to the open house, two letters were received which expressed significant concerns regarding the proposal. One was received from members of the RCAS, and one was from a local resident. Comprehensive responses were prepared and a follow-up meeting was held with the Township of Goulbourn and the RCAS on 07 May 1999.

The Township has indicated that it supports the proposed contingency plan provided that a joint use agreement can be prepared in which the Region commits to:

- pump water to the Richmond Lagoons to meet the broad objectives of the Richmond Conservation Area Management Plan; and
- identify a means of restricting access to Lagoon Cell C which is sensitive to the aesthetics and functions of the Conservation Area.

Stakeholder Concerns

The RCAS recognized that the lagoons may benefit from the occasional infusion of nutrients contained in sewage, but had a number of concerns including:

- visual impacts and restrictions on access to the lagoons, including potential fencing requirements;
- constraints and opportunities associated with the proposal in terms of implications to the Richmond Conservation Area Management Plan;
- potential impacts on habitat;
- routing of any pipes to be constructed;
- construction impacts.

The primary opportunity associated with the proposal was the potential future use of the pumping station to pump river water into the lagoon cells to sustain and enhance existing habitat.

A local resident had a number of similar concerns regarding the visual impacts of fencing and the potential for frequent use of the lagoons for sewage storage.

Response to Stakeholder Concerns

While it is the intent of the Region to drain back any wastewater after it has been stored in Cell C during emergency conditions, the RCAS has requested that certain water levels be maintained over the course of the year. Any river water which is pumped to Cell C would be considered to be contaminated due to the occasional presence of wastewater. It is the recommendation of our Legal Department that fencing be erected around Cell C to minimize risk to the community. However, it is also recommended that the design of the fencing be carried out in consultation with the Township of Goulbourn to address the needs of the RCAS. It is further recommended that the Region negotiate an agreement with the Township to share the cost of this fencing given the potentially significant costs above normal Regional requirements for fencing. The RCAS is not in agreement with the recommendation for fencing, preferring alternatives such as signage, vegetative barriers, or use of security personnel services.

Potential alternatives for pumping water into the lagoons were being discussed by the RCAS at the time that the study was initiated. However, the RCAS had not prepared any feasibility studies, cost estimates, or evaluations of financing options. As part of the study, it was determined that modifications to the pumping station could be carried out that would permit the pumping of water from the Jock River to the lagoons at an adequate flow rate. Although no agreement has yet been reached with the Township, it is recommended that the Township pay for the capital costs of these modifications and that the Region pay for the associated engineering services, contract administration, and on-going operation and maintenance of the water supply system. Based on the information provided by the RCAS, three to four pumping operations would be required each year, with a continuous pumping duration ranging from 2

to 12 days. Pumping of water from Cell B to Cell C using portable equipment, and drawdown of water from Lagoon Cell C to the pumping station would also be required.

As described above, the work undertaken by Jacques Whitford Environmental Ltd. indicated that the use of Cell C for contingency purposes would not have a significant impact on habitat.

Concerns related to the routing of pipes and the mitigation of construction impacts will be addressed as part of the detailed design of the study recommendations.

STUDY RECOMMENDATIONS

At the conclusion of the study, the following major recommendations were made (refer to Annex A for a figure illustrating some of these recommendations):

1. lagoon Cell C should be used for temporary storage of sewage flows for contingency purposes;
2. sewage should be drained back to the pumping station following any contingency event in order to minimize the time that sewage is present in the Lagoon;
3. the existing 200 mm forcemain linking the pumping station to the lagoons should be extended to permit direct discharge of sewage to Cell C;
4. a high capacity bypass should be constructed to link the existing 500 mm forcemain to Cell C.
5. a weak section of the 500 mm forcemain underneath the Jock River should be twinned;
6. a second starter for the high capacity pumps at the pumping station should be installed; and
7. a new valve chamber for the forcemain should be installed.

The twinned section of forcemain and the new valve chamber are needed to provide additional protection against forcemain failure due to the risk of high pressures in the forcemain. The new pump starter would permit the station to continue to operate at full capacity in the event that the existing starter were to fail.

It was concluded that there are no “low-cost” system improvements which would provide a significant increase in pumping station capacity.

In order to address stakeholder concerns it is also recommended that:

1. modifications to the Richmond Pumping Station be carried out to permit water to be pumped to the Richmond Lagoons;
2. the Region provide an outlet to Cell B as part of the construction of the 200 mm forcemain extension to Cell C (this outlet to be used for pumping Jock River water to Cell B).
3. the Region consult with the Township of Goulbourn on the design of fencing required to restrict access to Lagoon Cell C.
4. the Region and Township enter into a Joint Use Agreement for the conservation area which would address:
 - what infrastructure will be owned and operated by each party;

- sharing of capital, operation and maintenance costs associated with modifications to the Richmond Pumping Station and construction of fencing around Cell C.

It is also recommended that the Region decommission the old Richmond Pumping Station in accordance with the recommendations of the study report.

The Class Environmental Assessment Process will require that a notice of completion be prepared and the Environmental Screening Report be placed on the public record for a period of thirty (30) days. Should there be no request to “bump-up” the study to a full Environmental Assessment, the project will be deemed approved and will proceed to detailed design and construction.

FINANCIAL IMPLICATIONS

The estimated cost associated with the all recommendations which would be financed entirely by the Region is \$810,000. This includes a proposed allocation of \$50,000 for the Region’s share of the fencing cost. Funds are available in the 1999 Capital Budget, Account No. 932-42056, Richmond Pumping Station Upgrade, in the amount of \$244,000.

Subject to further negotiation with the Township, it is recommended that the Township pay the estimated \$40,000 for the pumping station improvements which will permit pumping of Jock River water to the lagoons, and that the Region pay the estimated \$13,000 annual operation and maintenance cost associated with pumping water to the lagoons. This would require that an additional \$13,000 each year be included in the operational budget for the Water Environment Protection Division.

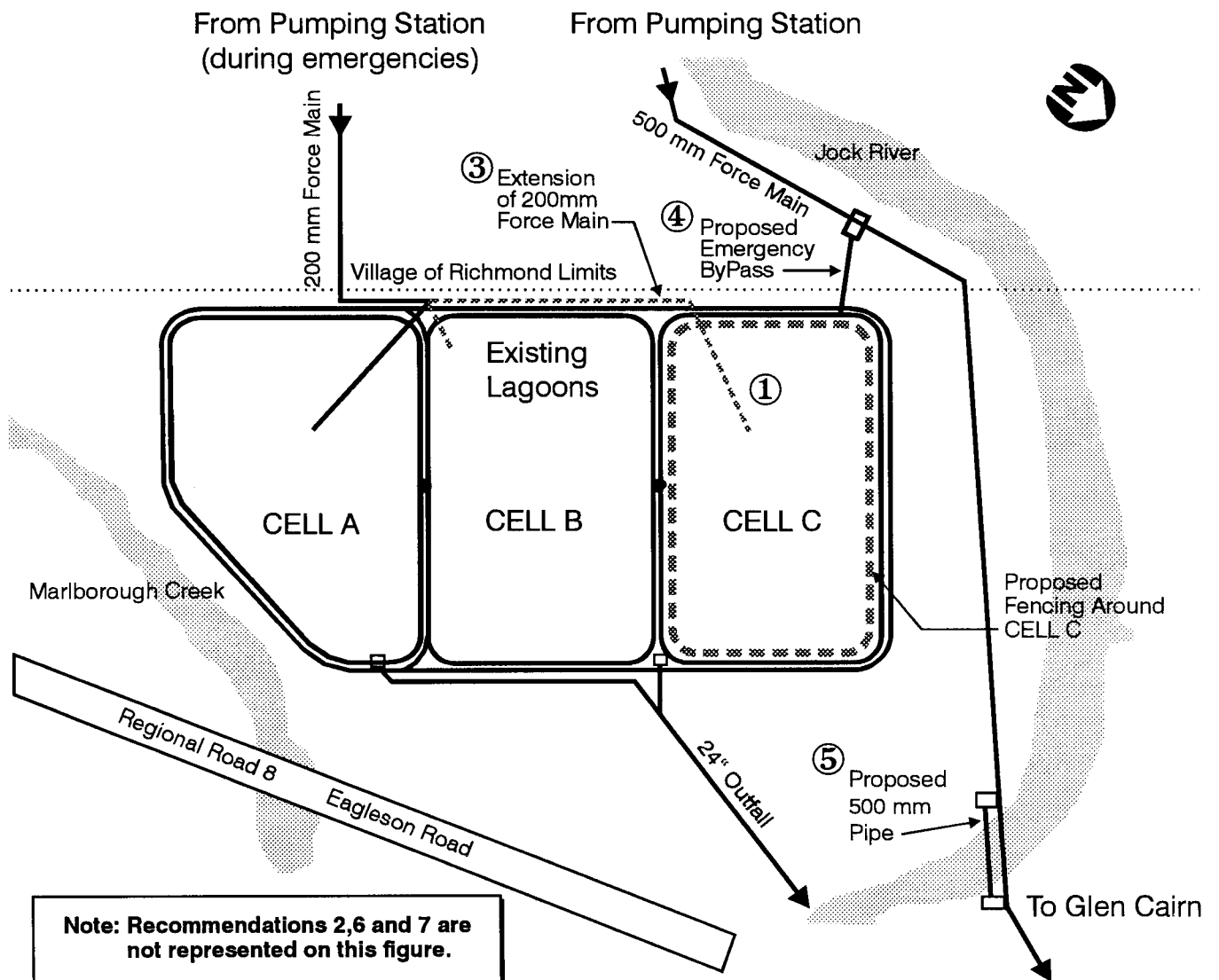
Should Council approve all recommendations contained in this report, additional capital project authority and operating costs will be identified as part of the 2000 budget process.

*Approved by
J. Miller, P.Eng.*

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ANNEX A

Richmond Pumping Station and Forcemain Study Recommendations



Note: Recommendations 2,6 and 7 are not represented on this figure.