REPORT
Regular Council Meeting
1992 July 13

THE CORPORATION OF THE DISTRICT OF BURNABY

ENVIRONMENT AND WASTE MANAGEMENT COMMITTEE

HIS WORSHIP, THE MAYOR
AND ALDERMEN

SUBJECT: WATER CONSERVATION

RECOMMENDATIONS:

1. THAT Council support, in principle, water conservation measures utilizing low flow plumbing fixtures.

2. THAT Council urge the Ministry of Municipal Affairs, Recreation and Culture, Building Standards Branch, in consultation with the Canadian Standards Association, the GVRD and local municipalities, to evaluate the performance of low flow fixtures and their impact on receiving sewage collection systems and if feasible, to develop appropriate amendments to the existing B.C. Plumbing Codes to incorporate water conservation measures.

3. THAT Council urge the GVRD to participate with the Province and the member municipalities in the evaluation of the effectiveness of low flow plumbing fixtures.

4. THAT Council continue to be active in its effort to promote water conservation and to identify ways and means of reducing the overall demand on the water resource.

R E P O R T

The Environment and Waste Management Committee, at its meeting held 1992 June 30 received and adopted the attached staff report advising on the feasibility of enacting Federal and Provincial regulations for water saving devices in new building construction and to outline a course of action that can be undertaken at the Provincial and Municipal levels.

The Committee therefore submits the report on water conservation for Council's endorsement.

Respectfully submitted,

Alderman L. Rankin
Chair

Alderman D.P. Drummond
Member

Alderman D. Evans
Member

Alderman D. Lawson
Member

Alderman C. Redman
Member

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- CHIEF BUILDING INSPECTOR

THE CORPORATION OF THE DISTRICT OF BURNABY

TO: CHAIRMAN & MEMBERS
ENVIRONMENT & WASTE
MANAGEMENT COMMITTEE

DATE: 1992 06 23

FROM: DIRECTOR ENGINEERING

FILE: 42-01-08

SUBJECT: WATER CONSERVATION

PURPOSE: To advise the Committee and Council on the feasibility of enacting Federal and Provincial regulations for water saving devices in new building construction and to outline a course of action that can be undertaken at the Provincial and Municipal levels.

RECOMMENDATIONS:

a) THAT Burnaby support, in principle, water conservation measures utilizing low flow plumbing fixtures;

b) THAT Burnaby urge the Ministry of Municipal Affairs, Recreation and Culture, Building Standards Branch, in consultation with the Canadian Standards Association, the GVRD and local municipalities, to evaluate the performance of low flow fixtures and their impact on receiving sewage collection systems and if feasible, to develop appropriate amendments to the existing B.C. Plumbing Codes to incorporate water conservation measures;

c) THAT Burnaby urge the GVRD to participate with the Province and the member municipalities in the evaluation of the effectiveness of low flow plumbing fixtures; and

d) THAT Burnaby continue to be active in its effort to promote water conservation and to identify ways and means of reducing the overall demand on the water resource.

REPORT

1.0 BACKGROUND

At the regular Council Meeting held on 1992 February 25, Council received a report from the Environment and Waste Management Committee on the subject of water conservation and subsequently adopted the following recommendations:

"1. THAT Council urge the Regional District to work with the member municipalities to develop region wide policy and programs on water conservation;

2. THAT Council authorize Burnaby's participation with the Regional District to develop public information and awareness programs to promote water conservation; and

3. THAT a copy of this report be forwarded to the Greater Vancouver Regional District."

Arising from the discussion, Council also requested staff prepare a report to the Environment and Waste Management Committee to advise on the water saving measures through low flow plumbing fixtures and the feasibility of enacting Federal and Provincial regulations for water saving devices in new building construction.

The purpose of this report is to provide the Committee and Council with the requested information and to outline a possible course of action that can be undertaken at the Municipal and Provincial levels.

2.0 MUNICIPAL WATER USE

To develop effective water conservation measures, it is necessary to find out first how water is used and the quantity of water consumed.

Water use surveys carried out in North America in recent years revealed that the per capita water use varies with each city due to climate difference, land use and household size. A survey of some major U.S. and Canadian cities indicates that the average daily water consumption per capita ranges from a low of 98 Imperial gallon/day (447 l/day) in Edmonton to 250 Imperial gallon/day (1132 l/day) in Phoenix, Arizona. Based on the 1991 record, the actual average daily water consumption per capita in Burnaby is approximately 165 Igal/day (747 l/day).

Table 1 provides a summary of water consumption data for some major centres in North America.

CITY	POPULATION	AVERAGE DAILY WATER CONSUMPTION PER CAPITA
Cities in Alberta and Ontario		
Edmonton	726,000	98 Igal/day (447 l/day)
Waterloo, Ontario	325,000	100 Igal/day (457 l/day)
Toronto, Ontario	630,000	158 Igal/day (710 l/day)
Cities in the U.S.		
Seattle, Washington	1,200,000	133 Igal/day (600 l/day)
San Diego, California	1,200,000	200 Igal/day (900 l/day)
Pasadena, California	135,000	200 Igal/day (900 l/day)
Denver, Colorado	980,000	234 Igal/day (1060 l/day)
Phoenix, Arizona	985,000	250 Igal/day (1132 l/day)
Burnaby	**158,000**	**165 Igal/day (747 l/day)**

TABLE 1: Average Daily Water Consumption

Based on studies conducted in the U.S., it was found that less than 10% of the indoor water use is consumed and not returned to a ground water system or waste water treatment facility. The remainder indoor flows are primarily related to toilet, shower and washing uses. A breakdown of the U.S. surveyed indoor water use is given in Figure 1.

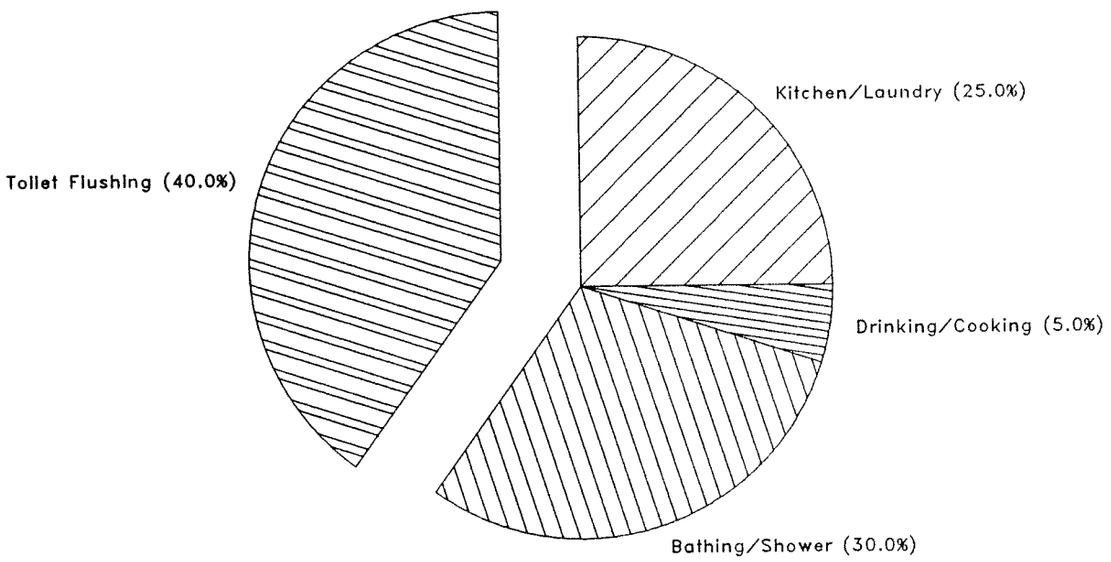

FIGURE 1 - Average Indoor Water Use Breakdown

(Source: Massachusettes Water Resources Authority and North Marin County Water District, California)

Notwithstanding the relatively high seasonal water consumption that occurs outdoors for landscape irrigation, a general conclusion can be reached that overall indoor water conservation efforts would best be focused on bathroom uses.

3.0 WATER SAVING DEVICES

3.1 Low Flow Toilets

Potential Water Saving

The conventional toilet uses from 2.3 - 5.5 Igal of water per flush. The type of toilet that is most commonly used in modern homes uses 2.7 - 3.8 Igal as compared to a low flow toilet that only requires 1.3 Igal per flush.

Low flow toilets have been used by water authorities in California, Massachusettes and Texas to promote water conservation. Research studies indicated that the low flow toilets meet or exceed current performance standards for the conventional toilets.

By replacing the conventional toilets with low flow toilets, it is estimated that the average household could save 6,500 - 11,700 Igal per year based on an average 4 flushes per day per person and 3.2 persons per dwelling. Based on a projected 2,000 new single/multiple residential dwelling units constructed in Burnaby annually, excluding commercial and industrial construction, the overall water saving would be 13.0M gal to 23.4M gal per year.

The estimated water saving may be underestimated as some U.S. research studies indicated the actual number of flushes per person per day may be greater than four. With the reduction of water consumption through the use of low flow toilets, it would also reduce the load demand on the wastewater treatment plants.

Concerns Related to Low Flow Toilets

Notwithstanding the water conservation benefits that can be derived from the use of low flow toilets, there have been concerns raised amongst public health and plumbing regulatory agencies about the ability of conventional sanitary sewers and service connections to operate in a satisfactory manner.

In area where the gradients of the sewer pipe are flat, there are concerns of the lack of self cleansing action within the pipe and the gradual residuals build up due to reduced water flow. This may lead to long term maintenance and health problems. Further study and evaluation is recommended to confirm the adequacy of the existing sewer collection and pumping systems for proper sewage conveyance with reduced water flow before low flow toilets are included in the plumbing standard.

Other Alternatives

Before low flow toilets were developed, the traditional installation of plastic bottles, bricks and other water displacing devices in the toilet tank have been commonly used in areas where water supply is scarce. However, the use of these devices can only save 10 - 20% of the water used and are not as effective as the hydraulically efficient low flow toilets.

There are other water conservation alternatives such as composting toilets and waterless toilets. However, they may be considered not practical by homeowners in the urban environment where water supply and sewer collection systems are available. These types of facilities lend themselves well in remote or undeveloped area where water supply or sewage disposal is limited or not available.

Notwithstanding the potential water saving from using low flow toilets and shower heads, careful analysis must be given in the code amendment process to take into consideration the effectiveness of the fixtures and their impact on the performance and maintenance of the receiving sewer system and treatment facilities.

5.0 FUTURE RESEARCH AND DEVELOPMENT

With respect to technology development and research on water conservation, staff are involved in a local technical committee on water conservation that has been formed recently. The general membership of the Committee includes technical staff from the GVWD, Ministry of Agriculture and other Lower Mainland municipalities. The objective of the Committee is to obtain and share information on water conservation plans and programs within B.C. It is hoped that through the efforts of the Committee, opportunities can be identified to promote water conservation and provide input on related Provincial legislation with respect to water saving plumbing fixtures.

In relation to public education and awareness programs, an interim communication plan has recently been developed by the GVRD to initiate and guide public consultation activities related to water quality, watershed management and water conservation issues. The plan includes public input and participation to encourage comment and consultation through open house and mall displays. It is hoped that through the public participation process, the general public will be made aware of the major issues such as water conservation and the measures needed for sustaining the water resource. The plan was submitted to the GVRD Water Committee for consideration at its last meeting on 1992 June 18.

6.0 CONCLUSION

To reduce water use and the costs of water supply and wastewater treatment systems, effective long term water conservation measures must be established. Based on results of water conservation studies conducted in the U.S., the potential water savings from the use of low flow plumbing fixtures could significantly reduce the overall water demand and related costs.

Water conservation by means of low flow fixtures can be implemented relatively inexpensively through amendments to the plumbing codes. However, in order to be effective and successful, the program must be carefully investigated and implemented. It would be prudent that evaluation and analysis first be carried out to confirm the adequacy of the conventional sewer collection system based on the reduced water flow before the low flow plumbing fixtures are adopted.

In concert with the water conservation measures required for sustaining the water resources, we recommend:

a) that Burnaby support in principle water conservation measures utilizing low flow plumbing fixtures;

b) that Burnaby urge the Ministry of Municipal Affairs, Recreation and Culture, Building Standards Branch, in consultation with the Canadian Standards Association, the GVWD and local municipalities, to evaluate the performance of low flow fixtures and their impact on receiving collection systems, and if feasible, to develop appropriate amendments to the existing B.C. Plumbing Codes to incorporate water conservation measures;

THIS PAGE WAS INADVERTENTLY MISSED
IN PREPARATION OF THE COUNCIL AGENDA.
THIS PAGE SHOULD FOLLOW PAGE 68, ITEM 6,
REPORTS, ENVIRONMENT AND WASTE MANAGEMENT
RE: WATER CONSERVATION.

3.2 Low Flow Shower Heads

Potential Water Saving

Conventional shower heads can deliver maximum flow rates of 2.5 to 5 Igal per minute. Recognizing the actual flow rates are lower than maximum rates due to the fact that most people do not run the shower at maximum capacity, a study conducted by the U.S. Housing and Urban Development concluded that the average shower uses approximately 17 Igal and identified that reducing water use through low flow shower heads would provide further water conservation measures.

As indicated in Figure 1, bathing/showers account for approximately 30% of indoor water use. In recent years, special low flow shower heads have been developed and tested for their performance and effectiveness. The average maximum flow rate for low flow shower head is 2.0 Igpm or less. According to results of pilot programs conducted in the U.S., the new fixtures were well received without performance related complaints. Other shower head retrofit programs such as the installation of a flow restrictor inside a conventional shower head have been used but were found to be less effective in terms of water saving than the special low flow shower head design.

It is estimated that for an average 3.2 persons household, water saving from using a low flow shower head could be in the order of approximately 8,200 Igal per household per year, a reduction of 30 - 40% to the existing shower head flows.

3.3 Water Saving Impacts

With the use of low flow toilets and shower heads, a total water saving of 14,700 Igal to 20,000 Igal per household per year could be realized which would also reduce the loading on the receiving sewer system. These figures when applied to a new dwelling unit constructed incorporating the low flow plumbing fixtures translate into a per capita reduction of 13-17 Igal/day. As previously stated, Burnaby's current per capita consumption is 165 Igal/day, thus the potential savings represented by utilizing low flow plumbing fixtures are in the 8-10% range of overall consumption.

4.0 POSSIBLE AMENDMENTS TO THE B.C. PLUMBING CODES

The B.C. Plumbing Codes are based on the framework of the National Plumbing Codes. The B.C. Codes are administered by the Ministry of Municipal Affairs, Recreation and Culture, Building Standards Branch. Approximately every two years, the codes are amended by the Ministry to reflect the latest changes in regulations, design standards and technology development.

With the objective of providing an effective long term water conservation measure, changes to the existing B.C.Plumbing Codes to require all new construction to use the low flow plumbing fixtures would reduce water demand thus conserving the water resource.

Staff have held discussions with the Ministry of Municipal Affairs, Recreation and Culture, Building Standards Branch regarding possible amendments to the B.C. Plumbing Codes to incorporate water saving plumbing fixtures. The Ministry advised that an initiative on water conservation has been put forward by the Greater Vancouver Regional District and the Ministry currently is reviewing the standards and acceptability of water saving fixtures before a final decision is made.

c) that Burnaby urge the GVRD to participate with the Province and the member municipalities in the evaluation of the effectiveness of low flow plumbing fixtures; and

d) that Burnaby continue to be active in its effort to identify ways and means of reducing the overall demand on the water resource and to meet the water conservation objective.

W.C. Sutherland
DIRECTOR ENGINEERING

LSC:jb

cc: Director Planning & Building Inspection
Director Administrative and Community Services
Chief Building Inspector
Municipal Solicitor