

CITY OF BURNABY
ENVIRONMENT AND WASTE MANAGEMENT COMMITTEE

HIS WORSHIP, THE MAYOR
AND COUNCILLORS

RE: Aphid Infestation on Tulip Trees on Pender Street

RECOMMENDATIONS:

1. **THAT** Council approve in principle Alternatives 3 and 4 as outlined in the attached report.
2. **THAT** a further staff report be brought back to the Committee and Council for final approval of the recommended solution upon the completion of a consultation process with the affected residents on the 4500-4800 blocks of Pender Street.

REPORT

On 1998 October 14, the Environment and Waste Management Committee approved the attached report outlining the following four alternatives to deal with the aphid infestation on tulip trees on Pender Street:

1. No further treatment
2. Selective tree removal with treatments
3. Selective tree removal with treatments including systemic insecticide
4. Complete tree removal with replacement

The Committee expressed a preference for alternatives 3 and 4 and suggested that all of the alternatives be the subject of a consultation process with area residents. Upon completion of the public consultation process, a report will be provided to the Committee and Council with a finalized plan.

Respectfully submitted,

: COPY - CITY MANAGER
- DIRECTOR ENGINEERING
- DIR. PLNG. & BLDG.
- DIR. PARKS, REC. & CULT. SERV.

Councillor L. Rankin
Chair

Councillor D. Johnston
Member

Councillor D. Lawson
Member

1998 October 08

TO: ENVIRONMENT AND WASTE MANAGEMENT COMMITTEE

FROM: DIRECTOR PARKS, RECREATION AND CULTURAL SERVICES
DIRECTOR ENGINEERING
DIRECTOR PLANNING AND BUILDING

SUBJECT: APHID INFESTATION ON TULIP TREES ON PENDER STREET

PURPOSE: To seek approval in principle for alternative programs to present to the affected residents toward development of an acceptable solution for implementation in 1999.

RECOMMENDATIONS:

That the Environment and Waste Management Committee recommend:

1. THAT Council be asked to approve in principle Alternatives 3 and 4 as outlined in this report and;
2. THAT a further staff report be brought back to the Committee and Council for final approval of the recommended solution upon the completion of a consultation process with the affected residents on the 4500-4800 blocks of Pender Street.

REPORT

1.0 BACKGROUND

1.0 History of Past Treatments and Results

The City received a petition in 1994 from residents of Pender Street between Willingdon and Delta Avenues to remove and replace the existing boulevard trees to end the nuisance resulting from a sticky residue that settled from the trees onto private and public property. Staff investigation revealed that over eighty tulip trees (*Liriodendron tulipifera* L), most planted in a 1985 local improvement project and now quite large were heavily infested by the tulip tree aphid (*Illinoia liriodendri*). Recognizing the severity of the nuisance and yet the value of the trees as a community amenity, staff undertook integrated pest management initiatives in 1995 through 1997 in an attempt to reduce the nuisance to a tolerable level. The City worked with ES CropConsult and the Davey Tree Expert Company in the development and implementation of the control programs.

1.2 1995 Program:

During the summer of 1995, ES CropConsult was contracted by the City to assess the existing aphid infestation on the tulip trees on Pender Street, augment existing predator insects with releases of aphidoletes midges and green lacewing insects, monitor the program and report on the results. Monitoring data and subjective analysis revealed a steady decline in the quantity of sticky residue secreted by the aphids through August and September. The results were promising and appeared to indicate the predator releases had assisted the native predators to lower the population more quickly than might otherwise have occurred. Follow up programs were determined to offer the greatest opportunity for reduction of aphid populations to tolerable levels if they combined several treatments and comprehensive monitoring. Monitoring would assist in determining the best time to apply treatments that may include the release of biological predatory insects, and the application of dormant oil and insecticidal soap sprays.

1.3 1996 Program:

The program undertaken in 1996 included the application of horticultural oil to the trees in the dormant season, the release of biological aphid predators during the summer, monitoring of the program and assessment of results. Dormant oil is a critical component of aphid management as it will effectively smother and kill any aphid eggs it can effectively cover. Predatory midges and lacewing insects can be effective in supplementing native predatory insects in controlling all stages of the aphid life-cycle. Assessment of the 1996 program indicated there was no significant difference in the quantity of honeydew secretions over previous years; in fact the problem appeared to have worsened. The severity of infestation and the difficulty experienced in effectively applying the dormant oil to the dense canopies of the tulip trees appeared to be the main contributors to the continuance of the problem. There was indication that the sheer quantity of the aphids feeding on the trees outpaced the ability of native and introduced predatory insects to effectively diminish the infestation. ES CropConsult suggested that effective control may only be achieved through undertaking more radical measures including selective removal of up to 70% of the trees and replacement with aphid-free species, reducing the size of the remaining trees and application of an insecticide.

1.4 1997 Program:

Following consideration of the results of the 1996 program an accelerated integrated pest management approach was approved by council for 1997. This program continued the initiatives commenced in 1996 with the addition of insecticidal soap treatment. Although insecticidal soap is known to offer only moderate effectiveness in itself in the control of aphid infestation, staff considered the existing integrated pest management program would be more effective with this treatment included. In addition, staff considered this methodology to be compatible with the goals and objectives of the City's Integrated Pest Management Policy. However, the increased level of aphid management in 1997 did not improve the overall impact on aphids. The pattern of the rise and fall of the aphid population throughout the growing season was almost identical to that of 1995 and 1996. This indicated that little disruption of the aphid life cycle had occurred despite the treatments applied. Staff concluded that an even more intense level of management including tree removal and replacement, crown thinning, dormant oil and insecticidal treatment would be required to reduce the nuisance to a tolerable level.

1.5 Current Conditions:

A petition (Attachment) was again received from residents of Pender Street in 1998 supporting resolution of the problems connected with the tulip trees by the City of Burnaby and the affected neighborhood. The petition stated that the trees "... create increased nuisance, increased liability, conservation concerns and unnecessary costs to taxpayers." No treatments were applied to the trees in 1998. Staff monitored the infestation for severity following three years of treatment. The sticky residue commenced later in 1998 but the infestation rapidly attained the same level of severity as in previous years. Although the tulip tree aphid is found throughout the City wherever the tulip tree grows, aphids are also found on many other tree and plant species. However, the severity of the infestation and the problems it causes on Pender Street is exceptional. The uniqueness of this situation is likely due to the large number of trees in close proximity at this site and specific, yet difficult to quantify microclimate factors. The tulip tree aphid problem is not unique to the City of Burnaby. It is a problem in many urban forests. One survey of over 1500 American cities found that aphids were considered to be the most important group of street tree insect pests in the United States. The tulip tree itself (*Liriodendron tulipifera* L) is often host to a particularly abundant aphid species (*Illinoia liriodendri*) which appears wherever the tulip tree is grown. The copious quantity of sticky residue produced by an infestation of tulip tree aphid has combined with some other features of this tree species to result in a significant reduction in its use in the landscape of urban areas. Recognising that the aphid problem on Pender Street is exceptional and that past programs have not been sufficiently effective to reduce the aphid infestation to a tolerable level due to the high aphid population at this site, staff now offer several intensive alternative programs for consideration toward solving the aphid nuisance on Pender Street. These alternatives must consider any value of these trees as an amenity against the respective environmental and economic cost to the community of each program.

2.0 ALTERNATIVE APHID CONTROL MEASURES

2.1. *No Further Treatment*

The considerable inconvenience and discomfort borne by the residents of Pender Street over the last several years as a result of an insect infestation that shows no indication of abating is deserving of continued effort by the city to solve the problem. Although selection of this alternative requires no further direct financial outlay by the city, the compromised living conditions of the residents must be considered a significant cost. In addition, city sidewalks and other infrastructure will continue to be at risk from the aggressive growth habits of this tree species and should be considered a long term cost. Staff do not support this alternative.

2.2 *Selective Tree Removal with Treatments*

The tulip tree at maturity is a very large tree. The trees on Pender Street are growing strongly. They can be expected to ultimately attain a height approaching 100 feet and a canopy spread of perhaps 50 feet. Tree spacing on Pender Street is inadequate with the majority of trees separated by only 30 feet. A spacing between 60 and 70 feet is more suitable to the species. The overbearing density of the tree canopies along Pender Street would be significantly reduced through selective removal of alternate trees. In addition the enhanced tree to tree spacing would reduce breeding sites for the aphids and permit improved access to the remaining tree canopies during the application of dormant oil and insecticidal soap treatments. Trees in the 4800 block of Pender are at adequate spacing. No selective removals would be anticipated on this block. Approximately 50% of the trees on the 4500-4700 blocks of Pender would be removed. The remaining trees throughout the 4500-4800 blocks would receive treatments including crown thinning, dormant oil and insecticidal soap application. Crown thinning will reduce the highly susceptible inner canopy by 20-30% to further reduce aphid breeding sites and permit improved coverage of the dormant oil and insecticidal soap treatments. In addition, the reduced canopy density will permit greater light penetration reducing the 'heavy' aesthetic of the trees still further. An application of dormant oil will be applied during the winter months to smother and kill overwintering aphid eggs followed by two applications of insecticidal soap in early summer to smother and kill all existing life stages of the aphids on the trees. It is expected that the insecticidal soap treatments could be much more effective than previous applications due to the ability to obtain much better coverage of the inner canopy. In addition two applications separated by 14 days has been shown to be more effective than a single application as was used previously. Although it is expected this alternative will provide noticeable improvement it is not expected to solve the problem. It likely is only a short term moderation of the infestation. The increased tree spacing will permit continued, even increased strong growth of the remaining trees. The canopies of these trees will ultimately close ranks and again provide the deep shade of the current trees. Crown thinning will be required every year to permit the ongoing effective application of the dormant oil and insecticidal soap. As trees grow taller the effectiveness of these treatments will diminish. Further, even following the initial selective removal and treatments it cannot be known whether the secretions of sticky residue will be reduced to tolerable levels - especially for those residences adjacent retained trees. The initial cost to implement this alternative and monitor and assess results is approximately **\$26,000**. If this alternative was successful in reducing the problem to a tolerable level it is anticipated that it would be required to spend a minimum of \$13,000 per year indefinitely to control or perhaps just slow a resurgence of the infestation. Staff do not support this alternative.

2.3. *Selective Tree Removal with Treatments including Systemic Insecticide*

As in Alternative 2, selective tree removal and crown thinning are considered essential to reduce problems associated with the tulip tree on Pender Street. These problems include heavy shade, excess leaf litter, sidewalk damage and the mess created from excessive sticky residue secretions from aphid insects. Selective removal and crown thinning will reduce breeding and overwintering sites for the aphid insects and can be expected to reduce the effects of the infestation. However, without further treatments combined with removal and thinning, the infestation will rapidly achieve former levels of nuisance. An alternative to the use of dormant oil and insecticidal soap is the use of a conventional systemic insecticide. The use of an insecticide is an acceptable component of an integrated pest management system in culturally modified landscapes. The City Integrated Vegetation and Pest Management Policy states "... With very severe infestations of large trees in areas where extensive honeydew cannot be tolerated, bark or injection system treatment with a systemic insecticide such as dimethoate is least disruptive to natural enemies, other beneficial insects and the environment in general." Contact insecticides that might be considered such as Malathion, Pyrethrins and Rotenone are less desirable. These insecticides must be spray applied several times during the growing season as they only kill on contact with the insect. Economic cost and threat to the environment are increased with this type of application and are generally not as effective in controlling the problem.

An alternative to contact insecticides is the use of a systemic insecticide such as Cygon or Hopper Spray. These are typically painted on the trunk of the tree, once per growing season, out of reach of people. The chemical is absorbed into the tree's vascular system where it is translocated to the leaves. As aphids feed on the leaves they ingest lethal doses of the chemical thereby significantly reducing the resident aphid population. However, the recommended systemic insecticides are generally more toxic than contact insecticides and warrant a great deal of care in their application to avoid oral or dermal exposure to workers or members of the public. Furthermore as these insecticides are toxic to mammals, humans and insects it is possible that birds, preying on insects killed by the chemical, may ingest the chemical and spread it further through the food chain. To minimize these problems the application technique will follow Ministry of Environment, Lands and Parks and the manufacturer's application guidelines.

If, through the course of the public consultation, a systemic insecticide is selected as a means to address the aphid population, it will be necessary for the City to apply to the B.C. Ministry of Environment, Lands and Parks for a special use permit for application of the chemical as it is currently not registered for use on Tulip trees. The cost to implement alternative 3 which utilizes selective tree removal, crown thinning every third growing season and the application of dimethoate is approximately **\$20,000** in the first year and \$4500 in following years. Staff support this alternative as one of the two management options to explore in consultation with the community as a means to control the aphid nuisance while balancing concerns associated with costs, and changes in the visual character of the neighbourhood's streetscape.

2.4. *Complete Tree Removal with Replacement.*

The problems encountered with the tulip tree on Pender Street do not exist in isolation. Although site conditions vary and thus affect growing habits and associated problems, the tulip tree is today recognized as a major management problem in many urban forests. Originally selected for its tolerance to stressful urban conditions, its superior aesthetic value as a young tree and its availability to the landscape trade due to its ease of nursery culture, it has proven to be unsuited to many planting locations. Better suited to woodland or park settings the tulip tree is generally too large and aggressive for most street applications and is now known to be host to an economically unmanageable insect problem - the tulip tree aphid. The tulip trees on Pender Street are still relatively young trees, less than 20 years old. They can be expected to live at least a further 40 years and achieve considerably greater size - possibly attaining 100 feet in height. Removal of selected trees, in combination with various control treatments may initially reduce the aphid nuisance. However the infestation may not be reduced to a tolerable level and will certainly evolve to intolerable levels as the trees grow beyond the ability of staff to economically or even physically manage. Complete, one time tree removal will eliminate the problem. In addition the opportunity will be presented to plant in the most suitable locations new, attractive and pest resistant species better suited to the environment, the needs of the community and the spirit of the City Integrated Vegetation and Pest Management Policy. It should be noted, however, that the removal and replacement of the tulip trees will significantly change the visual character of these four blocks of Pender Street, perhaps more so than the area residents fully appreciate. Therefore, this issue will need to be clearly addressed with the community during the exploration of this alternative.


Alternative 4 would see eighty-two existing tulip trees removed and replaced with seventy-one more suitable trees planted with more appropriate spacing. It is preferred that two species be selected in communication with the community. The one-time cost to implement the tree removal and replacement alternative is approximately **\$50,000**. It is relatively rare for tree removal on this scale to be undertaken by a city to solve a tree issue. However, this is considered an intractable problem that demands an aggressive approach. The long term costs of aphid management and infrastructure repair, compared to the cost of removal and replacement with better adapted tree species, indicate that removal can be a more economical long term alternative. Staff support this alternative as one of the two management options to explore with the community that, while more expensive than Alternative 3, should eliminate the aphid problem and may provide more long term management and horticultural benefits than Alternative 3.

3.0 PUBLIC CONSULTATION

Given the potential impact of anyone of the alternatives on the environment and the affected residents staff are proposing to proceed immediately with a public consultation program involving the residents on the 4500-4800 blocks Pender Street to seek public input on the various options and the preferred options. Upon the completion of the consultation process staff will report back to the committee and Council recommending the final solution and cost implication.

4.0 CONCLUSION

In recognition of the severity of the nuisance created by the aphid problem on Pender Street staff have attempted to rectify the problem in the past several years employing IPM principles. The IPM approach has not been proven effective in breaking the infestation problem and having examined several alternatives staff have selected alternatives 3 and 4 as supportable solutions. Staff would proceed with a consultation program with the affected residents and report back to Council outlining the results of the consultation and the final recommended plan.

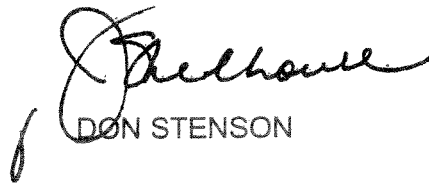


H. Monroe / For K.F.

KATE FRIARS



CRAIG SINCLAIR



DON STENSON

BR:dl

Attachment (1)

c:\monroe\aphid report




cc: Assistant Director Parks Services
Deputy Director Engineering

COLLECTIVE AGREEMENT FOR RESIDENTS AT 4700 PENDER ST.

We, the undersign, AGREE with the problem identified and SUPPORT resolution of the problem by the City of Burnaby with the neighborhood.

Problem:

The mature 20-30+ feet high Tulip trees with an approximate 20-30 feet drip radius from the city right-of-way where the trees are planted are creating increased nuisance, increased liability, conservation concerns and unnecessary costs to taxpayers.

<u>NAME</u>	<u>ADDRESS</u>	<u>SIGNATURE</u>	
Ed Lee	4704		(604)298-2918
Karen Zhou	4708	Karen Zhou	(604)294-8763
	4712		
	4716		
	4722	R Harrison	
	4728		
MASLIN G.	4736		294-4709
Tony Caporale	4742	Tony Caporale	294-5250
	4746		
Eddie Kenny	4754	Eddie Kenny	
	4758		
Jim Sui	4764		294-2050
	4770		
Nancy Ho	4780	Nancy	4739278
	4790		
	4787		
Queeny	4777		298-1106
	4767		

COLLECTIVE AGREEMENT FOR RESIDENTS AT 4700 PENDER ST.

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<u>NAME</u>	<u>ADDRESS</u>	<u>SIGNATURE</u>	
	4765		
WOODWORTH	4759	B Woodworth	
	4749		
	4745		
	4741		
Brown	4739		
	4737		
	4733		
D MAH	4719		
S Cooper	4717	S Cooper	
Wah Sam	4715		299-8322
Tai Siu Lung	4711		299-7923
Greg Fong	4707		298-3855
MAY LEE	480 BETA		294-6097

COLLECTIVE AGREEMENT FOR RESIDENTS AT 4600 PENDER ST.

We, the undersign, AGREE with the problem identified and SUPPORT resolution of the problem by the City of Burnaby with the neighborhood.

Problem:

The mature 20-30+ feet high Tullp trees with an approximate 20-30 feet drip radius from the city right-of-way where the trees are planted are creating increased nuisance, increased liability, conservation concerns and unnecessary costs to taxpayers.

NAME	ADDRESS	SIGNATURE
AERE, B	4610	B. Aere
ROBY, J Bruno, Tony	4614	Tony Bruno
CHAN, J	4618	Chan J
CARINO, B	4620	B. Carino
CHIU, P	4624	P. Chiu
TRINH, K	4626	K. Trinh
WONG, T	4630 4630	T. Wong
JANEL, R	4632	R. Janel
LEE, F FERNAND	4636 G.H.	F. Lee
DIRUGGIERO, D	4640	D. Di Ruggiero
MAURICIO, E	4642	E. Mauricio
YU, J	4648	J. Yu
PEIRONAGGI, F	4652	F. Peironaggi
MAH, T	4658	T. Mah
LOW, A	4660	A. Low
YIP, F	4668	F. Yip

CATANIA ANNA LUCIA
524 Alpha St

COLLECTIVE AGREEMENT FOR RESIDENTS AT 4600 PENDER ST.

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Problem:

The mature 20-30+ feet high Tulip trees with an approximate 20-30 feet drip radius from the city right-of-way where the trees are planted are creating increased nuisance, increased liability, conservation concerns and unnecessary costs to taxpayers.

NAME	ADDRESS	SIGNATURE
KWAN James	4601	HO KWAN
	4607	
PASTA.	4615	G. Pasta 298.1742
RANDAHWA	4621	Ray Randahwa
ARTUSO	4631	John Artuso
SCRIVANO	4633	Lucia Scirvano
MCLEAN	4637	
E. WIERBE	4639	E. Wiebe 2999672
KONG Sylvester James	4641	S. Kong
	4651	
RIZZUTO	4653	Giuseppe Rizzuto
MAN	4659	Emily Man
POON	4665	Robert Poon
STARKEY	4673	Richard Starkey
HARDING	4675	Luise Harding
O'Neil.	4679	John O'Neil
LEE	4683	John Lee

912
46.

Giannataria 479 Beta Ave Giannataria

COLLECTIVE AGREEMENT FOR RESIDENTS AT 4500 PENDER ST.

We, the undersign, AGREE with the problem identified and SUPPORT resolution of the problem by the City of Burnaby with the neighborhood.

Problem:

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NAME ADDRESS SIGNATURE

ALFRED CHAN	4502 Pender	[Signature]	
PEARL LANG	4510	[Signature]	
TERRY CHANTO	4516	[Signature]	
ANDRZEJ	4524 Pender	[Signature]	
Benjamin Pelletier	4514 E Pender	[Signature]	
Kang Ma	4528 Pender	[Signature]	299-8891
Alfonso Brun	4532	[Signature]	291-1787
Jeff Chan	4538	[Signature]	291-8628
V. FENG	4542	[Signature]	299-8622
[Signature]	4546	[Signature]	298-5981
GRAHAM	4550	[Signature]	
MIJAN BALBIR	4554	[Signature]	
R. DUBAN	4556	[Signature]	HUGE TREE!!!
SIDNEY FOSTER	4560	[Signature]	
Proza Aburumini	4564	[Signature]	320-1886
YI CHAN (294-0268)	4568	[Signature]	
D.A. PERROTTA	4586	[Signature]	
E. AMENDOLIA	525 H.P.H.	[Signature]	

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NAME ADDRESS SIGNATURE

<u>NAME</u>	<u>ADDRESS</u>	<u>SIGNATURE</u>	
Pe chichu	4503 Pender	Pe chichu	
Jennifer Hui	4509 "	Jennifer Hui	
M. KLEMOLA	4513 "	M. Klemola	
* R. Nguyen	4523 "	R. Nguyen	
* B + D SHAW	4529 "		(cedar trees)
Michelle Faneau	4533 "	Michelle Faneau	
Catherine	4535 "	Catherine	
MacLean		MacLean	
Robbie Robichaux	4537	Robbie Robichaux	298-9104
John Nguyen	4537 "	John Nguyen	291-1125
* OSKAR OJEDA ARELLANO	4541 "	Oskar Ojeda	
LUBICA DIX	4549 "	Lubica Dix	
KELVIN KONG	4553 "	Kelvin Kong	
KE Min Yell	4555 "	KE Min Yell	
Stephen Lum	4559 "	Stephen Lum	
D SHAW	4529 "	D Shaw	291-7700