indicates a need for greater tree clearance on a grounded wye system.

2. Formerly, contract crews had been left to themselves and obtained their own permission to trim or remove trees and were in many cases making their own decisions. Now the work is designated for them, the price is already established, and the utility has made the decision of what is to be done. Costly and doubtful practices have been recognized and eliminated.

3. Units have provided a means for non-tree people such as engineers, line designers and others to accurately estimate costs of tree work.

Summary. In the line clearance work we have established a long range schedule with the necessary recordkeeping to facilitate it in each Division. This program is aimed at the control of the amount of money spent for this kind of service as well as the reduction in line troubles resulting from tree interference.

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CONTRIBUTED ABSTRACT

Detection and Treatment of Girdling Roots on Selected Norway Maples

A number of trees growing in the urban environment are thought to be weakened and killed by the abnormal girdling growth habits of some of their roots. This girdling action is presumed to reduce the translocation of water and nutrients by crushing conductive tissues at the base of the truck and/or large lateral roots. This reduction of the flow of nutrients is commonly expressed in less than normal vegetative growth and symptoms of foliage nutrient deficiency. Trees affected usually do not die suddenly. They gradually weaken and die as a result of environmental stresses or attack by pests.

There are two basic types of girdling roots: Surface and subsurface. The leaves of a tree suspected to have girdling roots may appear abnormally light green in color and may abscise earlier than normal in the autumn. However, identical symptoms are associated with many other problems, and the girdling root must be observed to make a positive diagnosis.

There were seven treatments done to 480 trees in 1977-78.

Controls No girdling roots removed). (1.). Normal trees — no girdling roots present; nothing done to tree. (2.) Girdled trees — no fertilization or trimming. (3.) Girdled trees — fertilization but no trimming.

Treated (girdling roots removed). (4.) No fertilization or trimming. (5.) Fertilization but no trimming. (6.) Trimming but no fertilization. (7.) Trimming and fertilization.

The ultimate objective of this study is to gain insights into the identification, treatment and length of time required to treat girdling roots on urban street trees. Girdling root treatment is not done by the majority of urban foresters on an ongoing basis.

The specific objectives of the study are to evaluate the degree to which girdling roots are a problem on Norway maples (*Acer platanoides*) growing along streets in a defined area of the City of Ann Arbor, determine and describe the percentage of trees with surface girdling roots that also have subsurface girdling roots, identify and describe bole and foliage characteristics that are diagnostic of trees suffering from the effects of surface and subsurface girdling roots, identify and evaluate the effects of factors that contribute to the formation of girdling roots and to determine the extent to which trees with girdling roots are benefited the first two growing seasons after combinations of treatments including root removal, fertilization and foliage pruning.

The study will be completed during the summer of 1979 and incorporated into a doctoral dissertation available from the University of Michigan. *Robert L. Tate,* City Forester, Dept. of Parks and Recreation, City of Ann Arbor, Michigan.