2/2/16. DRAFT RESOLUTION: Cost-Sharing and Benefit Analysis for Undergrounding High Voltage Line in Jenifer Street Reconstruction Area.

This resolution is forwarded as a draft from the MNA Street Trees Committee to create a benefits analysis of canopy street trees and establish a shared cost plan to underground high voltage power lines (also known as "partial undergrounding") in the Jenifer Street reconstruction area.

INTRODUCTION

Of the many places which have brought the city of Madison national acclaim one is the historic and iconic area of Jenifer Street which was given a Great Places in America Neighborhood award from the American Planning Association in 2013. This area is in a locally recognized historic district, as well being listed as a nationally landmarked district.

A section of this area is slated to undergo a full street reconstruction in 2016 to address aging sewer infrastructure. As part of the current planning for the street reconstruction project this area is anticipating a radical loss of tree canopy from preemptive removal of large ash trees and exclusive replanting of low-growing shrub trees where above ground high voltage power lines are present, resulting in an eventual permanent loss of as much as half of the existing canopy street trees.

Due to the dense urban character of this area, coupled with extremely modest building set-back (resulting in lack of front yards) and zoning requirements that parking to be located in the back of the lots (resulting in lack of back yards) the myriad benefits of the street trees will be unable to be compensated for on private property.

The cost-sharing proposal is to divide the estimated $197,300 to underground the high voltage power lines in the Jenifer Street reconstruction area among the three groups of stakeholders: the city, MG&E, and adjacent property owners, in order to facilitate the safe continued growth of mature canopy street trees.

A. CITY OF MADISON

WHEREAS the section of Jenifer Street scheduled for reconstruction accepts its current role as transit corridor for five bus routes, carrying over 300 buses per day, and experiences the resultant noise, pollution, and degradation of community connectedness;

WHEREAS mature canopy trees have a mitigating role for all of the impacts of being a transit corridor from significant reduction in road-noise (1) removal of air pollutants (2) and creation of a sense of place (3);

WHEREAS the City of Madison Sustainability Plan with an aim of restoring and maintaining habitat calls for expanding and replacing canopy trees whenever possible, and directs creating a policy to underground power lines to achieve this (4);

WHEREAS an asphalt road surface undergoes a less severe degradation from UV rays and heat from the sun when shielded by canopy trees (5), resulting in cost savings from less frequent repair and resurfacing needs;

WHEREAS the City of Madison is or has undergone projects from numerous angles to reduce the flow of water during storm events (6) and whereas a single mature canopy tree can store 100 gallons or more of water (7) which is then evaporated out of their leaves, relieving the storm sewer of the water entirely (8);

NOW THEREFORE BE IT RESOLVED The City of Madison will fund 25% of the cost of undergrounding the high voltage power lines in the Jenifer Street reconstruction area in order to preserve the existing canopy trees and replace these as necessary with new canopy trees.

B. MG&E

WHEREAS Madison Gas and Electric, having recently undergone a community planning effort, cited as a cost-saving priority the avoidance of the need to further increase peak generation load capacity (9) and whereas MG&E has identified the use of air conditioning as the single primary driver of peak load (10) and whereas a single mature canopy tree can reduce an individual home's electric cooling use by as much as 20% (11) (12);

WHEREAS urban areas are projected to continue to undergo an increase in yearly high temperatures due to rising levels of carbon dioxide (13) and whereas a single mature canopy trees can absorb 48 pounds of CO2 per year (14) and thereby reduce the urban heat island effect and prevent an increase in peak energy demand (15);

WHEREAS MG&E can experience a significant increase in electric reliability from undergrounding 15kV distribution wires due to avoidance of storm damage from wind and ice-loading (16);

NOW THEREFORE BE IT RESOLVED Madison Gas and Electric will fund 50% of the cost of undergrounding the high voltage power lines in the Jenifer Street reconstruction area in order to preserve the existing canopy trees and replace these as necessary with canopy trees.

C. JENIFER STREET AREA RESIDENTS

WHEREAS a single mature canopy street tree increases a home's value 3%, or $7,593 of a $293,000 home (17) as well as adds value to homes within 100 feet of that single tree (17);

WHEREAS the presence specifically of mature canopy street trees has been shown to reduce crime. (18) (19);

WHEREAS the presence of trees has been shown to have such health benefits as reducing stress and increasing overall measures of wellbeing and life satisfaction (20) and as evidenced by communities already subject to the radical loss of trees due to the Emerald Ash Borer, the presence of trees protect against cardiovascular and lower-respiratory-tract illness (21);

NOW THEREFORE BE IT RESOLVED the property owners in the Jenifer Street reconstruction area through an equitable scheme of cost division similar to that used in calculating street reconstruction costs be structured to divide amongst property owners fund 25% of the cost of undergrounding the high voltage power lines in the Jenifer Street reconstruction area in order to preserve the existing canopy trees and replace these as necessary with canopy trees.

CITATIONS

1. Road traffic noise reduction by vegetation in the ring road of a big city Th. Samara1 and Th. Tsitsoni http://users.auth.gr/tsitsoni/files/gr/10.pdf
2. THE EFFECTS OF URBAN TREES ON AIR QUALITY, David J. Nowak USDA Forest Service, Syracuse, NY 2002 http://www.nrs.fs.fed.us/units/urban/local-resources/downloads/Tree_Air_Qual.pdf
3. Urban Forests Can Increase Cultural Identity and Sense of Place in a Community http://articles.extension.org/pages/67804/urban-forests-can-increase-cultural-identity-and-sense-of-place-in-a-community
4. Madison Sustainability Plan – Fostering Environmental, Economic and Social Resilience. City of Madison, 2011. http://www.cityofmadison.com/sustainability/documents/sustainplan2011.pdf http://www.cityofmadison.com/sustainability/documents/sustainplan2011.pdf goal 7: Restore and Maintain Natural Habitat (pp. 16 and 17) Preserve and expand urban forest resource
   Action item #8 Minimize loss of tree cover and green space in public rights of way

   Action item #9 Promote, expand and replace tree canopy trees whenever possible and encourage landowner collaboration on strengthening tree canopy and woodlands

   Action item #10 Create a policy to facilitate underground placement of power lines and overhead wires
5. EFFECTS OF STREET TREE SHADE ON ASPHALT CONCRETE PAVEMENT PERFORMANCE. http://www.fs.fed.us/psw/publications/mcpherson/psw_2005_mcpherson001_joa_1105.pdf
6. http://www.cityofmadison.com/engineering/stormwater/
7. How Trees Can Retain Stormwater Runoff http://www.fs.fed.us/psw/programs/uesd/uep/products/11/800TreeCityUSABulletin_55.pdf
8. http://water.usgs.gov/edu/watercycleevapotranspiration.html
9. Energy 2030 Framework https://www.mge.com/community-conversations/framework.htm ":Reducing electric system peak will help us build and maintain an electric system that is only as big as we need to meet customer load and reduce the generating and distribution capacity that is needed only for times of peak use."
10. "Central air conditioners account for more electricity use during high-demand periods than any other appliance." Madison Gas & Electric. https://www.mge.com/customer-service/home/power-control.htm
11. Energy Saving Trees. http://energysavingtrees.arborday.org/#About "When planted properly, a single tree can save a homeowner up to 20% on energy costs."
12. Energy-saving trees: Reducing Residential Energy Demand through Trees April 2013 http://mpaenvironment.ei.columbia.edu/files/2014/06/Energy-Saving-Trees.pdf page 21 "Alliant Energy A Midwest utility that serves customers in Iowa, Wisconsin, and Minnesota Operation ReLeaf offers residential utility customers in Iowa trees at highly discounted prices. Funded by Alliant Energy, ReLeaf is administered by the Iowa Department of Natural Resources Bureau of Forestry, the conservation boards of host counties,20 and uses iTree software. The trees are projected to help reduce cooling costs by up to 25%."
13. http://www.nrs.fs.fed.us/niacs/carbon/forests/carbon_sequestration/

14. http://urbanforestrynetwork.org/benefits/air%20quality.htm "Trees reach their most productive stage of carbon storage at about 10 years at which point they are estimated to absorb 48 pounds of CO2 per year."
15. EPA Heat Island Cooling Strategies http://www.epa.gov/heat-islands/heat-island-cooling-strategies
16. Underground vs. Overhead Transmission and Distribution http://www.puc.state.nh.us/%5C/2008IceStorm/ST&E%20Presentations/NEI%20Underground%20Presentation%2006-09-09.pdf page14 "An improvement of up to 10 times is possible when lines are placed underground."
17. http://www.fs.fed.us/pnw/research/gcra/pdfs/pnw_2008_donovan001.pdf
18. The Effect of Trees on Crime in Portland, Oregon. Geoffery H. Donovan, Jeffery P. Prestemon http://eab.sagepub.com/content/44/1/3
19. The relationship between tree canopy and crime rates across an urban-rural gradient in the greater Baltimore region, Austin Troya, J. Morgan Grove , Jarlath O'Neil-Dunnea http://www.nrs.fs.fed.us/pubs/jrnl/2012/nrs_2012_troy_001.pdf
20. Would You Be Happier Living in a Greener Urban Area? A Fixed-Effects Analysis of Panel Data, Mathew P. White, Ian Alcock, Benedict W. Wheeler and Michael H. Depledge, Psychological Science, published online 23 April 2013, DOI: 10.1177/0956797612464659 http://www.ecehh.org/research-projects/urban-green-space/
21. The Relationship Between Trees and Human Health: Evidence from the Spread of the Emerald Ash Borer http://www.ajpmonline.org/article/S0749-3797(12)00804-5/fulltext "Results suggest that loss of trees to the emerald ash borer increased mortality related to cardiovascular and lower-respiratory-tract illness. This adds to the growing evidence that the natural environment provides major public health benefits."

Additional Documentation and Planning Resources

iTree, a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools. https://www.itreetools.org/

Urban Street Trees 22 Benefits Specific Applications Dan Burden, Senior Urban Designer https://www.michigan.gov/documents/dnr/22_benefits_208084_7.pdf

Sustainable Cities Institute – Urban Forestry http://www.sustainablecitiesinstitute.org/topics/water-and-green-infrastructure/urban-forestry

Forestry Commission of England, The Case for Trees in Development and the Urban Environment http://www.forestry.gov.uk/pdf/eng-casefortrees.pdf/$FILE/eng-casefortrees.pdf

Energy Conservation Through Trees http://actrees.org/files/Resources/factsheet_energy.pdf

What is a tree worth? Jill Jonnes Wilson Quarterly, 2011 http://wilsonquarterly.com/quarterly/winter-2011-the-seven-million/what-is-a-tree-worth/