

The background features abstract, overlapping green geometric shapes in various shades of green, creating a modern and dynamic visual effect. The shapes are primarily triangular and polygonal, with some areas having a fine grid texture.

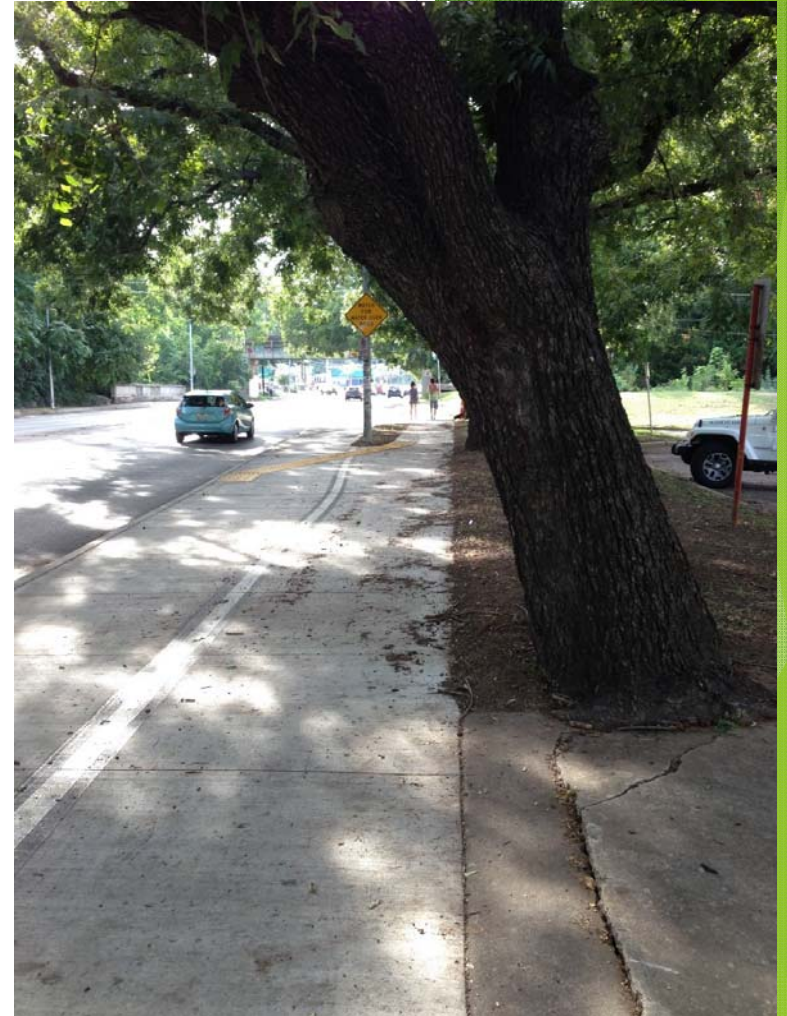
Alternative Sidewalk Solutions

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- ▶ Issues at site:
 - ▶ Sidewalk does not meet code with regard to critical root zone of trees
 - ▶ Austin City Code Subchapter E and Environmental Criteria Manual
 - ▶ Sidewalk cracking due to tree root growth
 - ▶ Requires maintenance and repair
- ▶ Objective:
 - ▶ Propose new sidewalk design and/or materials that
 - ▶ Protect trees
 - ▶ Maintain Sidewalk
 - ▶ Aesthetically pleasing



Overview of Code Criteria

Austin City Code (Ch.25 Subchapter E):

- ▶ **Core Transit Corridors: Sidewalks and Building Placement**
 - ▶ no sidewalk shall be less than 15 feet in width
 - ▶ two zones: a planting zone, and a clear zone
- ▶ **Planting zone**
 - ▶ The planting zone shall have a minimum width of eight feet (from face of curb)
- ▶ **Clear Zone**
 - ▶ The clear zone shall be a minimum width of seven feet

Environmental Criteria Manual:

- ▶ A minimum of 50 percent of the CRZ must be preserved at natural grade
- ▶ No cut or fill greater than four 4 inches will be located closer to the tree trunk than $\frac{1}{2}$ the CRZ radius distance.
- ▶ No cut or fill within the distance from the tree which is three 3 times the trunk diameter ($\frac{1}{4}$ CRZ)

Alternative 1: Moving the sidewalk

Advantages

- ▶ Durable
- ▶ Easy to place
 - ▶ Familiarity for the contractors
- ▶ Pedestrian friendly
- ▶ Keeps continuity of sidewalk

Cost: \$5 per sq ft

Disadvantages

- ▶ Inefficient use of space
 - ▶ Must be placed outside the ½ CRZ
- ▶ Impermeable
- ▶ Not flexible
- ▶ Costly repairs/frequent damage



Alternative 2: Wooden Decking

Advantages

- ▶ Low to med impact on roots
 - ▶ Can be placed within $\frac{1}{2}$ CRZ
 - ▶ ≤ 4 in cut/fill
- ▶ Aesthetics

Disadvantages

- ▶ Susceptible to weather damage
 - ▶ Rotting due to rain water
- ▶ Not continuous
- ▶ Not smooth for bicycles and wheel chairs

Cost: \$8 per sq ft



<http://marcy-twss.blogspot.com/2014/02/muir-woods-and-mt-tam.html>

Alternative 3: Rubber Panels

Advantages

- ▶ Can be within ½ CRZ
- ▶ Flexibility
- ▶ Permeable
- ▶ Meets ADA friction standards
- ▶ Relatively low cost for panel replacement

Cost: \$9 per sq ft

Disadvantages

- ▶ Lower lifecycle than expected
- ▶ Discontinuity of sidewalk
- ▶ Target for vandalism



<http://greatergreaterwashington.org/>

Alternative 4: Porous Flexible Pavement

Advantages

- ▶ Permeable
- ▶ Flexible
- ▶ Close tree proximity
 - ▶ Minimal digging
 - ▶ Can place within ½ CRZ
- ▶ Slip Resistant
- ▶ Strong
 - ▶ 2" can handle light vehicle traffic

Disadvantages

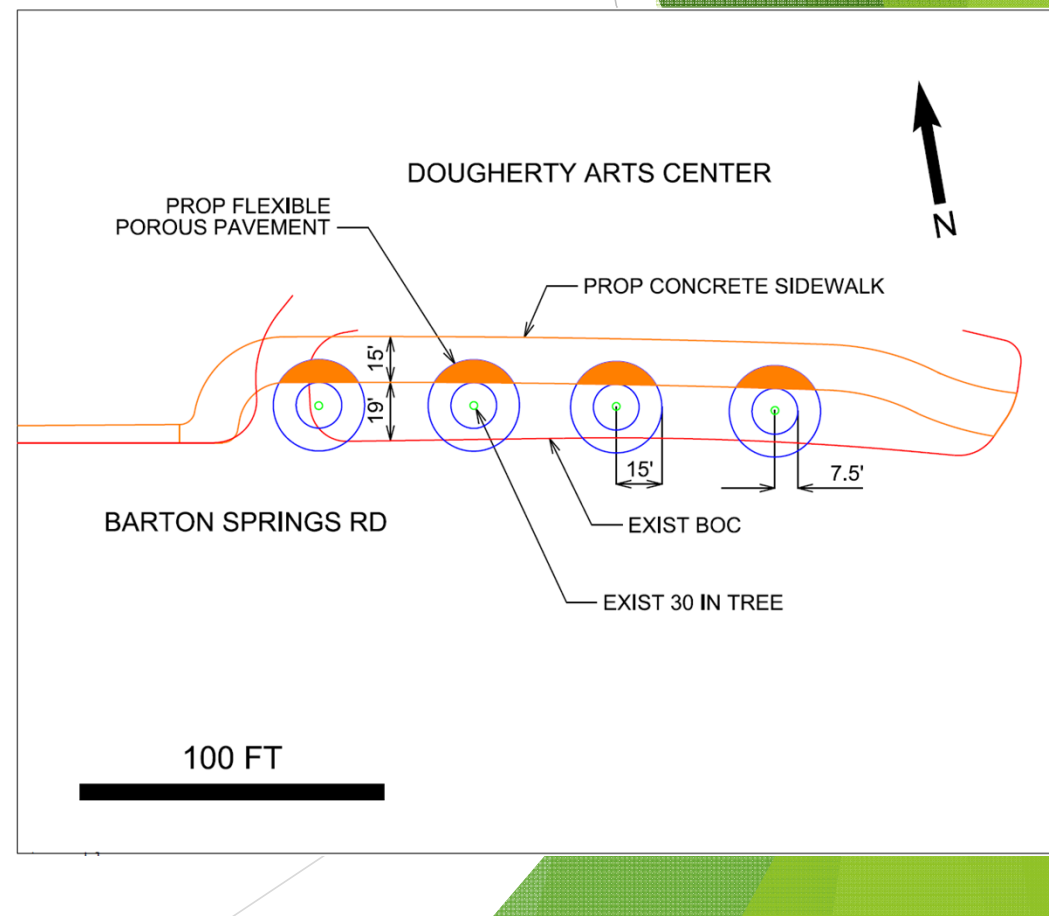
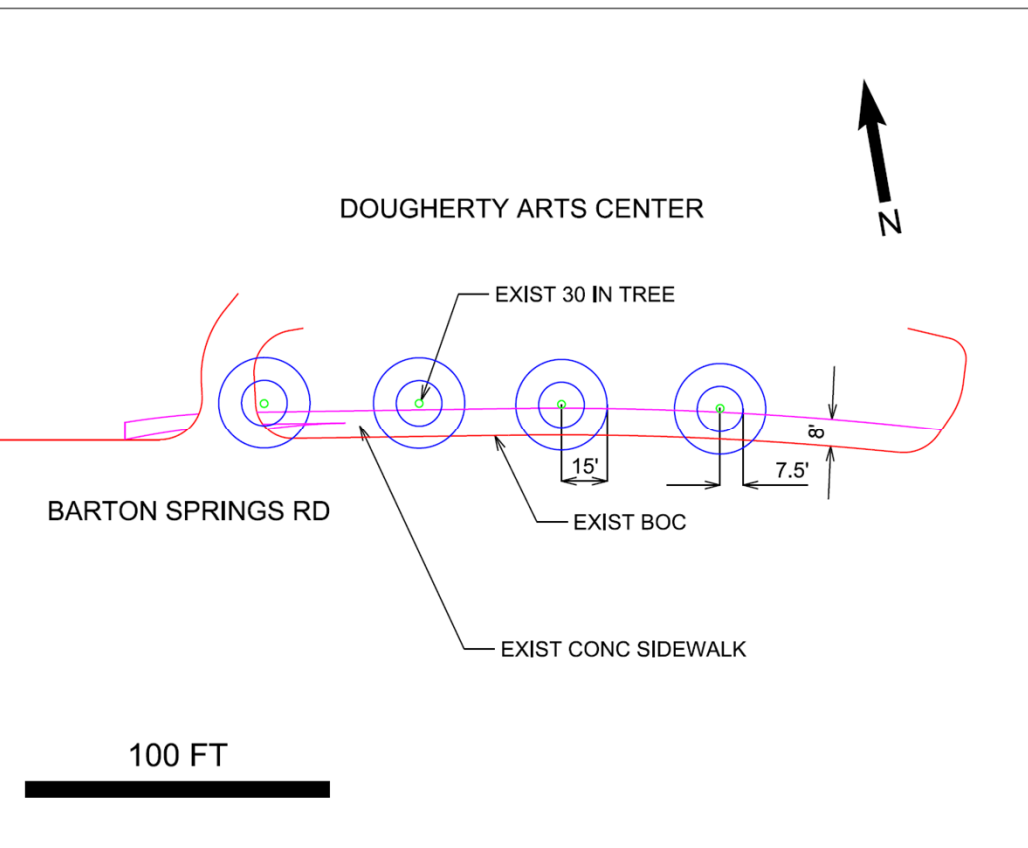
- ▶ Pores tend to clog
 - ▶ Reduces permeability
 - ▶ Requires maintenance
- ▶ New installation procedure
- ▶ Aesthetics

Cost: \$9 per sq ft



<http://greatergreaterwashington.org/post/19401/new-sidewalk-uses-porous-flexible-pavement/>

Geometric Sketches



Recommendation:

Test Phase of Porous Flexible Pavement

- ▶ Accommodates tree root growth
- ▶ Can be placed within ½ CRZ
- ▶ Can be used in conjunction with concrete
- ▶ Durable
- ▶ Comparable cost to concrete

<http://www.easypaveinc.com/wp-content/uploads/Porous-Pave-Brochure.pdf>



- ▶ http://www.homewyse.com/services/cost_to_install_wood_decking.html
- ▶ <http://www.citylab.com/tech/2014/05/the-sidewalk-of-the-future-is-not-so-concrete/371377/>
- ▶ <http://greatergreaterwashington.org/post/19401/new-sidewalk-uses-porous-flexible-pavement/>
- ▶ <http://www.txdot.gov/business/letting-bids/average-low-bid-unit-prices.html>
- ▶ https://www.municode.com/library/tx/austin/codes/land_development_code?nodeId=TIT25LADE_CH25-2ZO_SUBCHAPTER_EDESTMIUS
- ▶ http://www.ehow.com/how_7995782_build-wood-sidewalk.html
- ▶ <http://nepis.epa.gov/Exe/ZyNET.exe/91018M1N.txt?ZyActionD=ZyDocument&Client=EPA&Index=1995%20Thru%201999&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C95THRU99%5C TXT%5C00000032%5C91018M1N.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=3>
- ▶ <http://clermontstorm.net/porouspavement.pdf>
- ▶ [http://www.greendesignetc.net/GreenProducts_06_\(pdf\)/Syed_Asma-Sidewalks\(paper\).pdf](http://www.greendesignetc.net/GreenProducts_06_(pdf)/Syed_Asma-Sidewalks(paper).pdf)
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