

## Chattanooga Storm Water Discussion Points

Recently, the City was provided with several questions and statements' regarding the City's proposed storm water standards. In an effort to answer each discussion point fully, we have compiled both the question/statement, below, followed by answers, in blue. As the process of adopting a Chattanooga-specific plan has always been focused on community input, including a Technical Advisory Board and dozens of presentations to various groups over the last few years, we are happy to discuss any point further or answer any additional questions citizens may have.

### A The City's Present Plan

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1. Proposed rules require the capture, holding and then discharge of 1" of rain water through below ground water migration and/or evaporation, so that in three days time, it can gather, store and dissipate another 1".
  - a. Clarification: The proposed rules are for the runoff from a 1" rain. While it might seem to be semantics, the differences are significant as the actual runoff volume is less than the rainfall volume. Not all rainfall runs off due to interception and evapotranspiration that occur normally under current practices. The proposed RMG methodology takes these and other factors into account to minimize the amount of constructed volume required to meet the 1" rule.

See the answer to A.4. below for additional information.

2. This rate increases to 1.6" in the South Chickamauga watershed by a decision of the City.
  - a. The recommendation to increase from 1" to 1.6" in South Chickamauga Creek Watershed is based upon TMDL and Threatened/Endangered species requirements found in the NPDES permit. After analysis of the city's watersheds, these conditions overlap in the South Chickamauga Creek watershed. The 1" amount represents approximately the 85% percentile rain event in Chattanooga. The 1.6" amount was chosen because it represents approximately the 95% percentile rain event in Chattanooga. The 95% percentile was chosen because it matches current federal rules imposed on federally constructed buildings and has been proposed (or announced as a potential proposal) for all MS4 NPDES permits in the US.

See the answer to F.2. for information on how redevelopment affects the 1.6" proposal.

3. The city estimates the cost to collect, hold and dissipate storm water at \$30/cf.
  - a. The \$30 Value is based on the National Storm Water Calculator found at [http://greenvalues.cnt.org/national/cost\\_detail.php](http://greenvalues.cnt.org/national/cost_detail.php). This is an average cost estimate that covers construction and long term maintenance of the replacement RMG practice and other associated impact into the MS4 infrastructure from not constructing the stormwater control. The range of green infrastructure costs can vary from \$5/CF to \$100/CF depending on the site and the development plan.
4. At \$30/cf, and with 1" of rain equaling 3,630 cf/acre. This results in an estimated cost of \$108,900/acre.
  - a. The calculation above assumes the entire 1" rainfall volume. Based upon the clarification of item A.1. above, the volume per acre is less once RMG practices are applied and accounted for in the calculations. In fact many of the RMG practices are not completely new in the context of a

development as current costs to comply with landscaping and other provisions can be modified so that a far smaller incremental cost will be realized.

For example, if developing a site and have to meet landscaping requirements through setbacks and tree installation, these land cover practices get assessed for their ability to infiltrate, evapotranspire, and intercept rainfall. The volume they capture is deducted from the overall required volume of a green infrastructure practice. In addition, these landscaped areas may be used for bio-retention (if soils allow) which is one of the least expensive GI practices.

Many of these are offset by savings elsewhere in the application of RMG practices depending on the overall site conditions and development approach. The formula is based on the development's weighted runoff coefficient (Rv) and disturbed acres. The calculation above also doesn't take into account the available cumulative 10% SOV reductions that can adjust the 1" or 1.6" requirement down to as little as 0.5".

The correct formula is: Est. total cost = \$30/CF x adjusted P (in)/12 x Disturbed Land Area (ft<sup>2</sup>) x Weighted Rv.

For example, the estimated total lifecycle cost per acre for a 1/5 acre residential subdivision including non-curbed road frontage (total disturbed SF = 43,710), located in a mixed use/transit oriented area in South Chickamauga with 0.025 acres (12.5%) undisturbed land per lot is **\$47,629/acre, or over 56% less** than the value stated above. See the calculation sheet at the end of this document.

5. If a development cannot support this volume, the city offers purchasing a credit at a cost of \$45/acre from them or another for \$163,350/acre.
  - a. If the primary development cannot support the volume, per TDEC's allowed exclusions, the City allows the developer to install and maintain SOV at offsite redevelopment and retrofit sites (offsite mitigation). TDEC requires the mitigation volume to be 150% of the primary site calculated volume. If offsite mitigation isn't desired, the City offers a fee-in-lieu option. TDEC requires the payment to be 150% of estimated primary site's costs. Based upon the \$30/CF average cost, the city's mitigation fee is \$45/CF. The mitigation volume and fee-in-lieu volume are based upon the RMG methodology volume stated in the A.1. clarification.  
Additionally, the city is offering an option for developers to buy/sell/trade excess volume built on sites that can infiltrate higher amounts of runoff. The cost of this excess volume will not be set by the city, but is based on the free market value agreed upon by the parties conducting the transaction.
6. In the south Chick watershed, compliance costs are from \$174,240 per acre (@ \$30/sf); to \$261,360 per acre (@ \$45/cf)
  - a. See A.4. and A. 5.
7. Rather than look to other jurisdictions for reasonable solutions, City staff hired their own engineers and spend >\$1m to create their "own" standards, who obviously gave them what they want, but at what cost? Tom Scott authored "Chattanooga's own" regs back in the 80's and early 90's and that's why we're subject to higher standards today than our surrounding cities. We're about to do it again.
  - a. This response is offered as a statement of facts and is not intended as a rebuttal or justification. The current MS4 NPDES permit was issued in November 2010 and effective December 1, 2010. At the time the RFP was issued for this project there were very few jurisdictions with similar regulations. The two top RFP submittals had different types of experience with RMG-style practices in different regions. Both had developed RMG-style manuals for local or state governments. One had equal

parts of design/implementation vs. manual development (some under development in TN), while the other had significant design/implementation experience vs. limited manual development experience in the US Northeast. The consultant selection and scope was driven by executive management, not departmental management or staff.

8. City staff cries that “TDEC made us do it” and it’ll cost us \$250m if we don’t do this.
  - a. At more than 20 presentations to outside groups on the development of RMG standards and regulations, staff has stated that the requirements are based in the MS4 NPDES permit. Specifically permit section 3.2.5.1. Staff has also stated that the city has been subject to enforcement of environmental permits before and pointed to current and former Commissioner’s Orders and Consent Decrees from TDEC and EPA.

## **B Facts**

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1. There was no involvement of stake holders in the creation of the proposed regulations.
  - a. In late 2011 the city formed a Technical Advisory Group (TAG) with core members representing:
    - i. Associated General Contractors of East TN,
    - ii. Home Builders of Southeast TN,
    - iii. American Institute of Architects (Chattanooga chapter),
    - iv. American Society of Landscape Architects (Chattanooga chapter),
    - v. American Society of Civil Engineers (Chattanooga chapter), and
    - vi. Chattanooga Landscape Professionals.Other adjunct groups were also included in the TAG and are shown in the attached list. Meetings were held approximately bi-monthly or quarterly beginning in early 2012 to educate TAG members of the requirements and discuss the science and assumptions being applied as the project progressed. RMG materials, including draft manuals, were shared with the TAG as they were developed.

Unfortunately some members were not diligent in their attendance and some groups may not have been represented as well as the city and the groups might have hoped or desired. The city requested and encouraged TAG members to distribute materials and information to their membership and provide feedback as the standards and manual were developed. We received very little feedback except for what occurred during the meetings themselves. Members of the represented groups should contact their representatives if they feel they were underrepresented.
2. The Blue Ribbon Committee mandated storm collection funds to be sequestered. We need an accounting of all monies since implementation. Both sources and uses.
  - a. Prior to the Blue Ribbon Committee formation in 2009/2010, all Water Quality fees (formerly known as Stormwater fees) have been, and continue to be, kept separate in an enterprise fund since the fee was established by City Council in 1993.
3. The Blue Ribbon Committee was told the storm water fee would create funds necessary to accomplish requirements of the Permit, which were known at that time.
4. The City is now/or should be collecting \$26m/year.
  - a. Water Quality billings are approximately \$19-20 M per year. Revenue projections are reduced approximately \$3M per year after considering unpaid (but still due and billable) WQ fees from State, County and other properties, allowances for unpaid bills until collection efforts can recover

the fees, credits and exemptions allowed under state and city law. The resultant revenue projections for FY15 are approximately \$16.8M.

5. These proposed new storm water requirements effectively impose an additional \$108,000 to \$263,000 tax on each acre developed property.
  - a. The costs of complying with the new regulations are necessary to comply with NPDES permit regulations imposed upon the city by TDEC under the federal Clean Water Act and its sister regulations in TN code. They are not a tax or fee.
6. With a land area of 143.2 square miles in the City of Chattanooga, this amounts to a \$10 trillion dollars to \$15 trillion. This is just to deal with water falling out of the sky!!!!
  - a. The figures in this statement are based on incorrect base assumptions clarified in A.1., compounded by the later assumptions also addressed by these responses. The figures also further assume that every inch of Chattanooga will be disturbed and thus require RMG practices.

## C Science

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1. No one has been able to describe how subsurface water storage will improve water quality. But they want us to spend big bucks to satisfy their curiosity.
  - a. The science behind infiltration, water reuse and the screening and dissipation of pollutants through nutrient uptake, soil and other medium filtering has been widely known and used for decades. Municipal waste water treatment facilities have used forms of this treatment for 30+ years.

Studies have shown that with the exception of runoff from highly polluted urban hotspots, infiltration does not cause groundwater contamination. Pollutants are broken down naturally in the underground soil, stone or sand medium. What remains is insufficient to cause groundwater pollution. Conversely, the former treatment method of attenuation and extended detention results in urban contaminants (metals, oil/grease, bacteria, temperature, sediment) being conveyed directly, through large increases in volumes, to receiving streams and downstream floodplains.

RMG style practices replace the need for extended detention in most smaller storm events. Extended detention as currently implemented in Chattanooga and many other places results in lower flow rates, but the increased volume is not mitigated. Because of the increased volume the ponds flow at a predevelopment rate for a longer period of time. This increased time results in increased shear stresses on the soils. Natural banks exhibit increased erosion downstream from properly design extended detention because they can naturally handle the higher stresses, but only for short durations and at lower frequencies when minor damage is repaired by vegetation over a long period of time. RMG style practices that do not discharge runoff from a 1" rain event will not contribute to this phenomenon. Over time these practices will be retrofitted to the existing public and private drainage system as redevelopment occurs, thus reducing the causes of such erosion making man-made and natural repairs both more effective and longer lasting.

RMG style practices typically mitigate most development's needs for detention/attenuation of smaller, more frequent storm events. In many cases, application of these practices will preclude the need for any additional detention facilities as the green infrastructure practices, if adequately sized, can attenuate peak discharges for even the larger design frequency events. RMG devices sized for

the full SOV volume also make additional total suspended solids treatment, achieved through extended detention or proprietary devices, unnecessary.

2. No one is sure what the long term effect of underground water storage will be.
  - a. Soils naturally infiltrate water. RMG practices do not require storage of water longer period than the soils would normally hold prior to development. The infiltration rate of the soil will not change unless amended. Therefore the subsurface soil properties will remain unchanged with regards to how long water remains in the pore space. Just like any other design process, standard engineering care should be taken near foundations and other structural elements to insure the structural needs are being met while still providing the necessary void space or other functions required to handle the runoff.
3. The permit says the regulations are designed to “mimic nature”. The 1” rule DOES NOT mimic nature.
  - a. While no man-made system or process will ever exactly match nature, RMG practices are a much closer representation of both flow and pollution filtration/reduction than current extended detention practices. Infiltration, evapotranspiration, soil storage and screening more accurately mimics natural, undeveloped hydrology. Detention ponds and pipe do not mitigate the abrupt shift in the water balance caused by land development. The new mandatory standards are more beneficial to water quality, erosion and sediment control, and channel protection. Separation from the public drainage system reduces the City’s stormwater infrastructure and maintenance costs. Volume reduction also reduces expenditures for offsite flood control and flood prevention programs and measures.
4. The 1” rule unjustly benefits land with a high perk rate.
  - a. The permit language was drafted by TDEC. Chattanooga made comments requesting language adjustments to allow for high clay/low infiltration rate soils. TDEC stated the language in these sections would not be modified because they were using identical language in all MS4 permits statewide. The city encourages all interested parties to monitor TDEC public notice advertisements on draft permits so they can provide input on proposed regulations that affect their interests.
5. The 1” rule unjustly penalizes land with a low or no perk rate.
  - a. See answer to C.4.
6. In Washington State the EPA prohibits the collection of water, even in rain barrels. Here they want us to collect.
  - a. Courts in the western U.S., including Washington, Colorado, Utah, and others have decided that other people have a right to the rain that falls on your property. Property owners who want to use the water for their own means are prohibited from diverting it without a valid water rights permit. Case law in Tennessee and the eastern U.S. is quite different. See this [link](http://www.naturalnews.com/029286_rainwater_collection_water.html) for more info about western U.S. water rights: [http://www.naturalnews.com/029286\\_rainwater\\_collection\\_water.html](http://www.naturalnews.com/029286_rainwater_collection_water.html)
7. The 1” rule is not as big of a deal in sandy soil. It is difficult in chert soils and nearly impossible in clay soils.
  - a. See C.4. However, the credits mentioned in A.5 above are allowed by the MS4 permit, but TDEC does not mandate their use. City staff knew upon reading this requirement in the draft permit in 2010 that these credits would be necessary to help offset the technical difficulties present in certain areas of Chattanooga. As a result, we incorporated them into the manual from the beginning. They represent the best tool made available to us by the permit.

8. The permit specifically limits the application of the permit's requirements to areas that "include the presence of sinkhole or other karst features". Approximately 80-90% of Chattanooga is karst. Therefore the permit should not be applied to these areas. Consistent with the permit.
  - a. While limestone is present under much of Chattanooga, areas of sinkholes and karst features are less widespread. The city uses and will continue to use TDEC definitions for sinkholes. See H.2. for additional discussion.
  
9. The 1.6" rule for the South Chickamauga watershed is not required by permit. And because the soils are largely clay, this rule creates an untenable condition in the fastest growing area of the City.
  - a. City staff has recommended the 1.6" for South Chickamauga as a result of overlapping NPDES requirements. Initially management believed more watersheds would be affected by these provisions. But that was not the case when staff performed the analysis.
    - i. Total Maximum Daily Load targets have been instituted over the entire Lower TN River watershed for sedimentation and fecal coliform. All watersheds in Chattanooga are covered by these two TMDLs. The MS4 permit requires the city to take steps to reduce these pollutants in affected watersheds. Several watersheds in Chattanooga are listed on the 303d list of Impaired Waterways for various reasons. Streams listed for fecal coliform would not benefit from an increase in RMG practice requirements because the sources of fecal coliform are not directly related to development, but have agricultural or sanitary sewer origins. Impaired waterways listed for sedimentation or habitat alteration would benefit from increased RMG requirements so they were considered further.
    - ii. The MS4 permit also requires the city consider Threatened and Endangered Species when implementing its MS4 program. The Chickamauga crayfish is on this list and only exists in the South Chickamauga Creek watershed.
    - iii. When these were overlaid and analyzed by staff and consultants the only convergence of these two requirements exists in the South Chickamauga Creek watershed. As a result city staff believed it was in the best interests of permit compliance to recommend an increase of the stay on volume requirement in the South Chickamauga Creek watershed.  
See F.2. for additional information.
  
10. By and large, the Chattanooga area does not draw its water from wells. There is no need to recharge the aquifer.
  - a. Hixson Utility District uses ground water sources for their domestic water distribution. Regardless, RMG is not about recharging the aquifer for domestic water usage. RMG will reduce stream bank erosion and the resulting aquatic habitat loss. Aquifer recharge is a secondary outcome that will result in additional base flow to streams in the form of slowly released groundwater. Groundwater provides base flow to streams for longer periods in between rain events enabling fish and other aquatic life to better survive.
  
11. The extent to which existing development "starves" the aquifer, the surrounding farmed areas allow increased absorption, not to mention that 30% of TAWC's 100 mgpd water is going into the ground.
  - a. The current permit language does not allow offsetting for other land uses as a means to reduce runoff from new or significantly redeveloped properties. Credits discussed in A.5. are allowed by the permit. Furthermore, agricultural land is responsible for the release of sediment and nutrients that create similar problem as those from construction sites and suburban lawn care practices. TAWC leaks are considered illicit discharges under city code when they occur on the surface for more than seven days. Discharges to groundwater are not the responsibility of the city under the MS4 permit. To the extent they pose a health risk to the public they will be monitored and acted upon by TDEC or the Groundwater Protection Division of the County Health Department.

12. Bets are that neither the City, TDEC nor the EPA will indemnify a property owner for damages such as collapse, sinkholes, subsurface flooding of adjoining property, or liquefaction of soils.
  - a. Any activity or development on private property is the responsibility of the owner. There are certain risks inherent in current development practices. Engineers and designers need to constantly adjust their focus to consider the impact of their design choices. Proper engineering design should consider the possibility of these events occurring and address them accordingly. Prudent risk management by the owner or developer in concert with the design and construction process will reduce the likelihood of these events occurring post construction.
13. The area upon which these regulations fall is miniscule compared to the area upon which these regs do not apply; those being; single family residences, farm land and roads. The land area where these regs apply could produce drinking water quality storm water and the Tennessee River would still be called Big Muddy. It will not have an impact and there's no way to justify its cost.
  - a. Conversion of agricultural land to any other use far outpaces development of new agricultural land within the city. Any agriculture development outside the city of Chattanooga is beyond the city's jurisdiction.
  - b. Areas these regulations apply to:
    - i. Single family residences in subdivisions must be addressed by the overall plan of development. That could result in a distributed RMG solution that places rain gardens on each lot, only on some lots, on community lots or other areas allowed by the regulations based upon the developer's choices.
    - ii. A simplified method has been developed for use on individual lots and smaller developments.
    - iii. Separate sections of the MS4 permit require city projects follow the same rules imposed on private developments.
  - c. Regardless of the quality of water produced by RMG practices or the relative volume compared to the Tennessee River, the Clean Water Act and the city's NPDES permit require the city to take steps to prevent, reduce or eliminate pollution from urbanized areas from entering waters of the state via city owned and/or controlled outfalls. As long as the Clean Water Act and the subordinate MS4 permit remains in effect, Chattanooga will have to comply with these provisions.

## **D Alternate Ideas**

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1. *The City of Chattanooga has created many important public/private partnerships. This should be one as well.*
2. *This is an opportunity to take a negative and turn it into a positive.*
3. *This is a chance to make development affordable and the City vibrant.*
4. *Though not necessarily in agreement with TDEC's permit, these suggestions are intended to comply with them.*
  - a. The city's MS4 permit expires Dec. 1, 2015. The city will apply for a new permit as required by the current permit. At such time as TDEC places the city's new permit on public notice, comments such as these from the public would allow TDEC to see how the public feels about these regulations and could help steer future regulations.

## **E Downtown/North Shore CSO Area**

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1. CSO structures (Combined Sewer Overflow Structures) protect the TN River, captures the necessary runoff and includes most of downtown and north Chattanooga.

- a. Discharges of combined stormwater and sanitary sewage from the CSO area are regulated by separate permit from TDEC to the city. CSO facilities and their downstream components are the critical point in CSO system capacity. Reducing the stormwater that gets into the CSO system should be a high priority. Any reduction in storm water runoff flows in the combined sewer area reduces the city's O&M costs and allows continued development of the CSO area.
2. Areas upstream of CSO structures should be exempt from all storm water regs, as they already capture the relevant quantities of storm water.
  - a. The West Bank overflow is a critical element for Consent Decree compliance. Many CSO and non-CSO facilities drain through West Bank on their way to MBWWTP. Reliance solely on existing CSO structures to control all downtown flows will eventually require upsizing those facilities at significant future costs or placing a moratorium on development in certain portions of downtown, or worse upon all areas upstream from West Bank. Any reduction in storm water runoff flows in the combined sewer area reduces the need for the city to raise sewer rates to fund such projects and allows continued development of the CSO area. Treatment of stormwater runoff flowing entering the CSO system adds significant costs to our municipal waste water treatment operations. We should avoid conveying and treating stormwater runoff whenever possible by requiring effective runoff reduction measures in CSO areas.

## **F Developed Areas**

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1. The areas already developed should be dealt with in a global fashion by the City. The City should use the \$26m/yr. to evaluate, collect, store and dissipate water, administer and maintain strategic water features to achieve permit objectives.
  - a. See B.4. for accurate revenue projections. If the current system were to continue, the water quality problems in the city would only be addressed by successively larger regional projects such as regional detention ponds and systematic stream bank repairs. Even with reduced flow rates from individual or regional detention facilities, increasing volumes will result in more bank erosion. While these could be fixed, additional development would add more volume creating more bank erosion and requiring more regional detention volume. Global approaches such as Atlanta, Los Angeles, Chicago, and New York result in unnatural systems that do not have any resemblance to the natural system we are accustomed to here in southeast TN. (Picture the concrete channels of the Los Angeles River used in movies.) While we are nowhere close to being any of these, this is an opportunity to take their negatives, try something different based on knowledge and research to make a positive impact over the long run.
2. Developed areas of the City should therefore be exempt from the regulations, as they should be dealt with globally by the City with the funding already in hand.
  - a. Existing developed properties are not required to make any changes until they undertake a significant redevelopment. When such redevelopment occurs the 1" and 1.6" requirement, depending on watershed automatically reduces to 0.9" under the MS4 permit language. This results in all redevelopment being subject to a 0.9" rule as the starting point when redevelopment occurs.
3. Creation water features with recreational characteristics should be encouraged.
  - a. This will be a decision for each developer to make for themselves.

## G Previously Undeveloped areas

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1. Development land should be evaluated for its ability to absorb water (perk). At project completion, the site area should absorb the same amount of the first 1" of rainfall as it did prior to development. This will mimic nature.
  - a. See C.4. and C.7.
2. This will still cost a significant amount of money that the downtown and already developed areas won't have to include, thus encouraging the redevelopment of areas with roads, sewers, utilities, etc.

## H Other

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1. The 1.6" of water in the South Chick Creek watershed should be abandoned. Over 70% of the watershed is in Georgia.
  - a. See C.9. for the rationale behind the 1.6" rule for South Chickamauga.
2. Credit for all the previous storm water constructions should be valued in full and subtracted from whatever we end up with.
  - a. These regulations are based on performance criteria of zero discharge of the runoff from a 1" rain. The value of previously constructed storm water facilities is not a consideration under the MS4 permit. Existing stormwater practices that are receiving water quality fee credits will continue to receive those credits as long as the required maintenance is performed just like is required today. However once significant redevelopment occurs, the permit requires compliance with the new standards.
3. Any and all work performed by any governmental agency shall wholly conform to the requirement ultimately approved within the boundaries of the property which is being disturbed (*i.e.*: no off site mitigation).
  - a. The MS4 permit already requires the city to conform to the new regulations. The city would be eligible for offsite mitigation under the same circumstances as any private development. The city is allowing private project to utilize off site mitigation. Any difficulties encountered by private projects will not be different were the project public. There is no reason the city should be treated differently merely because of its public status.
4. All property owned by governments, including the City, should pay into the storm water fund pursuant to their ERUs.
  - a. All properties are billed for their ERUs. The city does pay Water Quality fees from the General Fund for all city owned properties. Federal government properties are required to pay Water Quality fees pursuant to federal law requiring them to do so. State and County government claim sovereign immunity under the pretense the Water Quality fee is a tax. This is not the case. Chattanooga's fee has been tested and upheld as a utility fee in federal court and in the 6<sup>th</sup> Circuit Court of Appeals. However, State and County governments still refuse to pay these fees. This is a collection practice that could ultimately require legal action by the city in order to collect any fees, penalties and interest that are due and payable to the city.
5. A method to collect storm water fees for sidewalks, streets, roads, highways and from County, State and Federal Governments should be developed and implemented to augment the fund as needed.
  - a. Currently the roads, curbs, gutters and sidewalks are public infrastructure that performs multiple functions including conveyance of stormwater. While these elements could be calculated, the

resulting payments would have to come from general funds in the city competing against other needs in the city and/or resulting in an increase of property taxes. Furthermore, the urbanized area of Hamilton County and all Tennessee Department of Transportation roads are covered by their own MS4 permit. Because they are not under the city MS4 permit the city does not spend water quality fees for regular activities. In the event of spill response activities on state or US highways in Chattanooga the responsible party is billed for the costs of the city's storm water response.

6. A variance board of stakeholders will be needed to administer whatever program is ultimately passed.
  - a. Currently, the SW Regulations Board handles appeals related to water quality fees enforcement actions, including civil penalties. The draft revised Code contains an entire section on our appeals process under the heading "variance procedures". It is proposed that appeals be made directly to the City Engineer. This section could be amended to allow variance appeals to the Stormwater Regulations Board.
7. Per section 3.2.5.2.4 Payment into Public storm water Project Fund It states the following:  
For projects that cannot meet 100% of the run off reduction and pollutant removal standards, and cannot provide for off-site mitigation, the permittee may allow the owner to make payment in a public storm water project fund established by the MS4. Payment into a public storm water fund must be at a minimum 1.5 times the estimated cost of on-site run off reduction controls.

Q: this would seem to indicate the dollar used is a case by case basis. It is also using what criteria? So can the developer submit a dollar amount and the City approve it as an option? As there are many options to choose from to achieve it- can the developer pick the least expensive such as where a developer says "if I had room onsite, I would perc the water into the soils". But my development plan does not allow me to do so. But the cost to do so would be say \$5 a cubic foot otherwise. So can he just pay \$5 a cubic foot if the cost to have achieved that is that number?

- a. If the developer has adequate reasons for not providing on-site mitigation, then three options are available. First, the developer may do off-site mitigation at another location within the same HUC12 watershed. Second, the developer may use a "stormwater credit" obtained from another site or that was purchased from someone else. This "credit" does not have to be within the same watershed, but must be within the City of Chattanooga. Third, the developer may buy into a City mitigation program. Based on information from Arcadis, we estimate the construction costs to be \$ 30 per cubic foot; thus, at 150% of the amount, we are currently projecting the amount to be \$ 45 per cubic foot (as mentioned above, this would be \$ 30 x 1.5 = \$ 45 per cubic foot).

The use of an average cost per CF establishes a known value for all parties to use without the need for submissions of detailed cost estimates and assumptions for each project and review of those submissions by city plan reviewers. The city believes the cost and time to perform these would result in lengthy delays for permit review and approval. To minimize this, the recommendation is to choose a single average cost for use in determining the payment amount. One reason for this method is because the reasons 1" SOV cannot be met will vary on every project. The only way to estimate the costs of constructing SOV on site is to change the assumptions of existing site conditions that create the constraint. Furthermore, it is not practical to assume the city will be able to find adequate amounts of similar ideal conditions. This would result in underpayment into the Public Storm Water Project Fund. If a developer paid the City \$5 per cubic foot and our actual costs are \$30, the water quality rate payers would have to make up the difference. Rate payers would be funding \$25/CF or 83% of the primary site's SOV responsibility.

The \$30 mitigation cost covers land acquisition, permitting, design, installation and recurring maintenance and other associated impacts to the MS4 infrastructure from not constructing the stormwater control. The permit requirement of 150% equates to a \$45/CF payment for the City to take permanent responsibility for a private development's SOV responsibility See A.3 for additional information on the methodology used to determine the mitigation cost.

#### 3.2.5.2.1 Runoff Reduction (infiltration or green infrastructure)

8. It states the following: when engineering analysis concludes that there are limitation to the application of runoff reduction requirements, this element of the program shall incorporate traditional storm water treatment practices at a minimum.

This language is not found in the permit specifically. For the purposes of answering the following question it is assumed the statement refers to permit section 3.2.5.2.2 regarding 80% TSS removal.

Q: Does this mean the engineer for the developer may determine there is not sufficient area/soils/etc. – based upon the plan the developer wishes to develop and thus do traditional treatment instead? IF THE CITY DETERMINES THIS-THEN HOW CAN THEY DO SO AND USING WHAT CRITERIA? IF THEY BASE IT SOLELY ON STORM WATER REGULATIONS – THEY COULD DENY ANY DEVELOPMENT.

- a. There is no ability to deny a development. City staff and an internal technical review committee would evaluate a hardship request and make a ruling based on the facts presented and any research that the technical review committee references. Hardship is defined by the permit as either 1) potential for introducing pollutants into groundwater, 2) pre-existing soil contamination, 3) presence of sinkholes and other karst features and 4) pre-development infiltrative capacity of soils. The technical review committee would simply verify if the developer had to use infiltration or the alternative water quality method of 80% TSS removal and SOV capture by one of the methods in I.1. above.

The engineer's site limitations determination is reviewed and either accepted or rejected by the City. A determination that standards cannot be met on site may not be based solely on the difficulty or cost of implementing measures, but must include multiple criteria that would rule out an adequate combination of infiltration, evapotranspiration and reuse.

Legitimate site limitations could include a lack of available area to create the necessary infiltrative capacity; a site use that is inconsistent with capture and reuse of stormwater; physical conditions that preclude the use of these practices.

The presence of any physical site limitations is determined by an engineer hired by the developer. He/she performs a geotechnical site analysis. Guidelines appear throughout the Rainwater Management Guide (RMG) and specifically in Appendix C: Protocol 3 Soil Testing. Limiting factors could include karst topography, high unseasonable (year round) groundwater table, brownfield sites, limiting bedrock, poorly infiltrating soils or other similar limitations.

Insufficient site area is not always a limiting factor because green roofs, water reuse cisterns, under pavement devices and other "land friendly" measures can be installed on some tight sites. If the site contains a documented limiting factor, the secondary tier requirements of TSS removal / attenuation are installed (per Hamilton County BMP manual). The site's unmet SOV requirements (preferred control practices) are met by the developer through the application of methods described in I.1. above.

Each development is required to either install SOV wherever feasible or apply earned or market acquired coupons for that volume. Only that portion of the site, where SOV is unattainable, is allowed to move onto offsite mitigation or fees in lieu. After a grace period of 12 months (ending on 12/01/2015), the current proposal is that each site must install a minimum of 50% of their baseline SOV requirement on-site before any of the mitigation measures: coupons, offsite installation or fees are considered. The grace period, favoring coupons in the 1<sup>st</sup> year, is intended to benefit the developer by establishing a secondary market for coupons, as soon as possible.

Our MS4 permit says that, if a hardship is claimed, the developer can treat the runoff to remove 80% of the TSS. Based on an analysis of Chattanooga's runoff using the WinSLAMM program, the model indicates that 80% of our stormwater pollution is carried by rain events of 2.1" and less (Meliora did the analysis under contract with Arcadis). There may be some wiggle room here because TDEC could potentially accept a smaller rain event provided that an alternative proposal would still accomplish the same effect as 1" of infiltration.

9. Q: How will existing developments where infrastructure was installed where there are in place existing detention facilities and a storm drainage system?

- a. The requirements are not retroactive. Previously permitted or constructed sites will not be required to retrofit simply as a result of the adoption of new regulations. Outparcels and other similar situations of vacant land within the limits of existing development can be grandfathered if detention infrastructure is already in there. If water quality infrastructure does not exist, then it would be needed through either water quality unit(s) or green infrastructure practice(s). Existing out-parcels and similar vacant land that remain undeveloped after 12/01/2014 can be grandfathered under the City of Chattanooga's prior stormwater management regulations. To be grandfathered, the vacant area must be served by an existing on-site, regional or shared stormwater management facility. This facility must have been designed, permitted, constructed and maintained in accordance with the peak attenuation, channel protection and total suspended solids reduction regulations enforced by the City at the time the development was permitted. In addition, the previously approved plans and hydrology study must show that no additional stormwater measures are required to be located on that out-parcel upon its development.

If additional on-site measures were planned to be built in conjunction with development of the vacant land, and were not incorporated into the shared facility, the vacant land will not be grandfathered. The vacant land must meet the City of Chattanooga's new runoff reduction standards effective 12/01/14. In addition, proposed impervious surface on the vacant land that exceeds the originally permitted area cannot be grandfathered. After 12/01/2014, any proposed additional impervious surface, exceeding what was detailed in the original plans or study will fall under the new standards and must be managed by implementation of runoff reduction methods and standards.

10. Q: How will sites be handled that presently drain into a body of water without traveling through a City maintained system? Are these properties exempt? Based upon the way I read the permit – it would not appear so.

- a. Correct, there is no exemption from RMG requirements. However, they may be exempt from peak rate control (detention) in certain circumstances, but not from water quality requirements.

11. Q: How will small residential home sites be handled? – Especially those where lots have previously been platted?

- a. Single family homes on individual lots that are not part of a larger plan of common development are exempt. Single family homes that are part of a larger plan of common development may have to

install RMG practices in accordance with the approved subdivision plan, if so submitted by the developer.

12. Q: Has the City put in place an appeals procedure in the event the developer and the City staff cannot agree on the proposed plan and the cost of the credits if needed to purchase? If so, does this work?
- a. See H.6. above.  
An internal Technical Review Committee will be established to review hardship requests that cannot be resolved by staff. The proposed Code revision contains new language to establish an appeals process under the heading "Variance Procedures". It is proposed that appeals be made directly to the City Engineer who will be a member of the Technical Review Committee. If the powers of the existing Stormwater Regulations Board were increased, they would hear appeals. Currently, the Stormwater Regulations Board handles appeals only to correct erroneous billing and to assess civil penalties.
13. Q: Why will credits given for mitigation currently expire in 15 years after new ordinance takes effect?
- a. This is only for water quality fee credits under the existing system. The new Water Quality Fee credit is based on performance and it is not similar to the proposed credit system. The City Attorney's Office recommended a sunset clause for the existing system long enough to pay off (and in some instances exceed) investment incurred by property owner. Knowing that many properties had invested significantly to qualify for the 2009 revisions to the Water Quality Fee credits structure, it was thought that a fifteen-year payback period for that investment would be justified based upon data reviewed during the course of those revisions talks.
14. Q: Why will no credits be given for holding on site the 1" of rain?
- a. Holding 1" is the baseline established by the new regulations. Because the new regulations are such a shift in technical thinking city staff believe it is better to encourage exceeding the minimum by constructing additional SOV that developers and owners can obtain a coupon for the excessive volume that can then be sold or traded in the free market. Granting Water Quality Fee credits for meeting the minimum does not reduce the city's costs for permit compliance or drainage system maintenance.
15. Q: How will "complete streets" blend with new regs? Will wider streets create more water to hold; design;
- a. Complete street is about functionality of those streets. RMG is about the performance of the elements from a stormwater perspective. It is possible for both to exist simultaneously. Complete streets can be a form of Low Impact Development and should blend well with the new regulations. Smaller the disturbed areas require less volume to be captured/infiltrated/or reused on site. In the future the city may choose to specify certain types of RMG practices be used in the ROW for practicality reasons.
16. Internal inconsistencies: There are internal inconsistencies between departments within the City of Chattanooga. Such departments are Public Works, Transportation, Sanitary Sewer, Storm water/Water Quality, and Regional Planning Agency.
- a. Public Work has coordinated with Regional Planning Agency, Land Development Office (Economic and Community Development) and Transportation during the development of the new regulations. There is on-going coordination between the departments to revise zoning requirements, subdivision regulations, stormwater and sewage management, and transportation goals in order to remove the inconsistencies. Other departments are aware of the inconsistencies of the proposed regulations with their existing codes and they are working on addressing their respective codes and regulations.

Example:

16.1. Investigate other cities in the State of Tennessee to see what they are doing that embrace economic development vs. economic delay and hardship.

- a. To our knowledge, Chattanooga and Nashville are the only cities in Tennessee that have made an attempt to comply with these new TDEC requirements (though a couple of small cities around Nashville adopted Nashville's methodology). There appear to be only minor differences between the Nashville and Chattanooga methods. TDEC has not released its methodology and is not expected to do so until at least the end of April. City staff will be conducting a comparison of the Chattanooga Method, the TDEC method, and the USEPA method. We should have something to report in the next two months if TDEC meets their schedule. An abstract has been submitted to StormCon to present our results at their national conference in August and it was accepted.

Funds have been requested in FY15 water quality budget to apply to TDEC to become a QLP and administer the state's Construction General Permit program locally. If approved, developers will no longer have to go to TDEC to get a CGP. Permit fees will be similar to what TDEC currently charges with some adjustments based on the additional review that we perform such as transportation, engineering, sanitary sewers, flood control, landscaping, zoning, inspections, etc. The goal is to save the developers that extra step and hopefully reduce the time it takes to get all their permits.

16.2. What is the sense of urgency in passing Resource Rainwater Requirements? Resource Rainwater goes into effect December 1, 2014. Why do you not want to have public input before this is implemented?

- a. The code will be adopted now, but will not be effective until December 1, 2014. This is the last date that the new regulation can take effect without violating the MS4 permit. Adopting them early allows everyone to know what is required and when.

See B.1. for additional information on stakeholder involvement (Technical Advisory Group). Staff from Public Works, ECD and RPA has conducted 25 presentations in the last 2 years with numerous stakeholder groups (see the Outreach Schedule below of 25 presentations made by staff to external groups since October 2012). In each of these we solicited input and feedback on the RMG and related information posted to the city's website for over 6 months. There is still time for public comments and review since implementation. A public meeting of the Stormwater Regulations Board is scheduled for April 3, 2014, at 2:30 pm in the Assembly Room 1-A of the Development Resource Center to obtain public comment on the RMG.

16.3. Stakeholders have not had time to review, digest, provide adequate feedback and support Resource Rainwater.

- a. See H.16.2 above.

17. Water Quality Buffer proposal appears to exceed the minimum permit requirement.

- a. The 60' WQ buffer echoes the required 60' construction buffer for TDEC Construction General Permit (CGP). While our MS4 permit only requires a 30' depending on the basin size, the CGP buffer is 60' depending on the 303d list classification. Since the majority of our streams are on the 303d list, it made sense to start with those criteria. To follow the permit will require developers to hire engineers to determine the basin size upstream of their parcel. In the end, the CGP buffer would probably end up governing anyway.

Calculations to support A.4.

Rv	Cover	Per Lot	Per Lot	Street Length	One Lane	One Lane
		ac	SF	Along 1 Lot	Width	Area
				FT	FT	SF
		0.2	8,712	93	12	1,120
Rv	Cover	per lot SF	5 homes SF	acres	Weighted Rv	
0	Undisturbed	1089	5,445	0.125		
0.116	Urban soils	4,400	22,000	0.505	0.0584	
0.966	pitched roof	2,700	13,500	0.310	0.2984	
0.688	sm. disconnected impervious areas - driveways	522	2,610	0.060	0.0411	
0.688	flat impervious street no curb	1,120	5,600	0.129	0.0881	
<b>Disturbed Areas</b>		<b>8,742</b>	<b>43,710</b>	<b>1.0035</b>	<b>0.4860</b>	



Disturbed acres on Five 1/5 acre lots + 93' of road frontage with 0.025 acres (12.5%) undisturbed per lot

Using \$30/cf results in the following calculations:

Rv	Total Disturbed SF	Adjusted P	Residential Scenario's Cost \$	Residential Scenario's Cost \$/Acre	Blanket Stated Cost \$	Res. / Blanket Cost %
0.49	43,710	0.90	\$47,794	\$47,629	\$108,900	43.74%

Disturbed on Lot sf	Disturbed on Lot ac	Undisturbed on Lot ac	Total Lot ac	Undis/Ttl Lot %
7,622	0.1750	0.025	0.2000	12.50%

Five 1/5 acre lots - undisturbed areas + road frontage (no curbs) = 1.0035 acres disturbed;  
 Cost/Acre = \$47,629



# THE CITY OF CHATTANOOGA

## RUNOFF REDUCTION TECHNICAL ADVISORY GROUP

NAME		PHONE	EMAIL	ORGANIZATION
Rob	Bradham	423.763.4379	<a href="mailto:rbradham@chattanooga-chamber.com">rbradham@chattanooga-chamber.com</a>	Chamber of Commerce
Glen	Craig	423.595.1563	<a href="mailto:glen.craigdesigngroup@gmail.com">glen.craigdesigngroup@gmail.com</a>	Craig Design/ASLA
Lisa	Darger	423.425.5916	<a href="mailto:lisa-darger@utc.edu">lisa-darger@utc.edu</a>	UTC
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Gary	Hilbert	423.643.5801	<a href="mailto:hilbert_g@chattanooga.gov">hilbert_g@chattanooga.gov</a>	City
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Karna	Levitt	423.643.5885	<a href="mailto:levitt_k@chattanooga.gov">levitt_k@chattanooga.gov</a>	City
Mounir	Minkara			City
Russel	Moorhead	423.756.3025	<a href="mailto:rdmoorehead@bwsc.net">rdmoorehead@bwsc.net</a>	ASCE
Jonathan	Nessle	423.596.4168	<a href="mailto:nessle2@epbfi.com">nessle2@epbfi.com</a>	Chat. Assoc. of Landscape Professionals
Michael	Patrick	423.757.0567	<a href="mailto:patrick_mike@chattanooga.gov">patrick_mike@chattanooga.gov</a>	City
Bill	Payne			City
Barry	Payne	423.595.9244	<a href="mailto:paynehomes@comcast.net">paynehomes@comcast.net</a>	HBAST
Gary	Sexton	4234244261	<a href="mailto:gsexton@sedev.org">gsexton@sedev.org</a>	SETDD





## OUTREACH SCHEDULE

Presentation Scheduling				
• <b>Basic Presentations to Organizations</b> (Water Quality New vs. Old Way, Economic Impact, Communication Tools, Water Quality Guide/Manual Information)				
Organization	Contact	Presenters	Meeting(s) Date	Meeting Location
Chattanooga – Hamilton County Planning Commission	Greg Haynes, RPA	Mark Heinzer Sarah Weeks	October 8, 2012 12:00-1:00pm	4th Floor-Hamilton County Courthouse
City Council		Mo Minkara Bill Payne	January 15, 2013	City Council (PW Committee meeting)
City Professional Industry (American Society of Civil Engineers)	Mark Heinzer <b>Site Development Manager</b> City of Chattanooga - Dept. of Public Works Land Development Office <a href="mailto:Heinzer_M@chattanooga.gov">Heinzer_M@chattanooga.gov</a> (423) 643-6023 – Office	Mark Heinzer Sarah Weeks	February 14, 2013 Lunch	DRC, 1250 Market St.
Chattanooga Chamber of Commerce	Rob Bradham, Vice President of Public Strategies (423) 763-4379 <a href="mailto:rbradham@chattanoogachamber.com">rbradham@chattanoogachamber.com</a>	Mark Heinzer Sarah Weeks	February 20, 2013 8:30am	Chamber Town Hall Meeting at Downtown Chamber Office
Lunch-N-Learn with <b>ADS PIPE</b>		Mark Heinzer	March 14, 2013 11:30am	DRC, Room 2C, 1250 Market St.
American Institute of Architects (AIA)	Lisa Williams Executive Director AIA Chattanooga <a href="mailto:exec@aiachatt.org">exec@aiachatt.org</a> 423-488-9900 P.O. Box 1067 Chattanooga TN, 37401	Mark Heinzer Sarah Weeks	April 9, 2013 11:00am-12:00pm	DRC, Room 1A, 1250 Market St.
Chattanooga Surveyors Club	D. Michael North Survey Manager <a href="mailto:mnorth@bettsengr.com">mnorth@bettsengr.com</a> 2800 South Market Street Chattanooga, TN 37410 <a href="http://www.bettsengr.com">www.bettsengr.com</a> 423.756-7777 office 423.313.5335 cell	Mark Heinzer Sarah Weeks	May 21, 2013 6:30pm	Wally's Restaurant, East Ridge
Hamilton Place of Chattanooga Rotary	Gina M. Crumbliss FSGBank VP, Marketing Manager 531 Broad Street Chattanooga, TN 37402 <a href="mailto:gcrumbliss@fsgbank.com">gcrumbliss@fsgbank.com</a> Tel: 423-763-9961 Internal: x5961 Cell: 423-280-2275 Fax: 423-267-3383	Mark Heinzer Sarah Weeks	May 22, 2013 12:00-1:00pm	Holiday Inn on Center Street (off of Shallowford Road behind Texas Roadhouse and next to CarMax)
Association of General Contractors	Roger Tudor President <a href="mailto:roger@gcctn.org">roger@gcctn.org</a>	Mark Heinzer Sarah Weeks	May 29, 2013 10:00am-12:00pm	101 West 21st Street, Chattanooga, TN
Homebuilders Association	Teresa Groves	Mark Heinzer	June 12, 2013	3221 Harrison Pike, Chattanooga,

	Executive Director <a href="mailto:tgroves@hbqgc.net">tgroves@hbqgc.net</a>	Sarah Weeks	11:30am – 1:00pm	TN 37406
East TN Chapter USGBC	easttnusgbc <a href="mailto:easttnusgbc@gmail.com">easttnusgbc@gmail.com</a> James Kane Education Program Specialist East Tennessee Green Building Council (USGBC-ET) (865) 208-7887	Mark Heinzer Sarah Weeks	June 26, 2013 11:30am-1:00pm	Green Spaces 63 East Main Street, Chattanooga, TN 37408
North Hamilton County Chamber of Commerce	North Hamilton County Council Pat Mahery (423) 702-1235	Mark Heinzer	August 15, 2013 11:45am – 1:00pm	Budweiser Distribution Center 200 Shearer Street, Soddy-Daisy, TN 37379
Chattanooga Engineers Club	Tim Lee Chattanooga Engineers Club Secretary <a href="mailto:timothy_w_lee@att.net">timothy_w_lee@att.net</a>	Mark Heinzer Sarah Weeks	September 9, 2013 11:30am – 1:00pm	Doubletree Hotel on Chestnut 407 Chestnut St., Chattanooga, TN 37402
Columbia Green Tech. Event		Mark Heinzer Sarah Weeks	September 18, 2013	Chattanooga Convention Center
Water Quality Summit Presentation	Andrea Ludwig, PhD Assistant Professor Biosystems Engineering and Soil Science The University of Tennessee Office: (865) 974-7238 Fax: (865) 974-4514 <a href="mailto:aludwig@utk.edu">aludwig@utk.edu</a>	Mark Heinzer Sarah Weeks	September 25, 2013 8:00am – 9:00am	Sheraton Read House
GA Tech Planning Graduate Students	Mark has this contact.	Mark Heinzer Sarah Weeks	11:30am-1:00pm	Green Spaces
CCIM	Lee T. Harper, CCIM Principal Broker Hudson Commercial, LLC 345 Frazier Ave, Suite 201 Chattanooga, TN 37405 423-486-1020 Office 423-280-6890 Direct <a href="mailto:lee@hudson-companies.com">lee@hudson-companies.com</a> <a href="http://www.hudson-companies.com">www.hudson-companies.com</a>	Mark Heinzer Sarah Weeks	October 15, 2013 11:30am – 1:00pm	Chattanooga Association of Realtors
Chattanooga Association of Landscape Professionals, Master Gardeners of Hamilton County	Tom Stebbins – UT/TSU Extension Agent for Hamilton County J. Merle Crawley Agriculture Services Center 6183 Adamson Circle Chattanooga, TN 37416 Phone: 423-855-6113 Fax: 423-855-6115 Email: <a href="mailto:tstebbins@utk.edu">tstebbins@utk.edu</a>	Mark Heinzer Sarah Weeks	October 22, 2013 6:30 pm	DRC, Room 1A 1250 Market Street, Chattanooga, TN 37402
Stormwater Board	Doug Stein Stein Construction Co., Inc. Ph. 423.698.0271	Joshua Rogers	November 18, 2014	DRC 1A
Chatt. Manufactures Assoc.	Tim Spires Chattanooga Regional Manufactures Association President and CEO Work. 423-266-1902 <a href="mailto:tspires@cma1902.com">tspires@cma1902.com</a> 10 West MLK Blvd., 5 <sup>th</sup> Floor Chattanooga, TN 37402	Mo Minkara	November 21, 2013	Chattanooga Convention Center
Green Express	Scott Drucker	Mark Heinzer	January 9, 2014	Chattanooga State College

Horticultural Short Course, 17 <sup>th</sup> Annual	<p>Scott@dreamgardensusa.com</p> <hr/> <p>Tom Stebbins – UT/TSU  Extension Agent for Hamilton County  J. Merle Crawley Agriculture Services Center  6183 Adamson Circle  Chattanooga, TN 37416  Phone: 423-855-6113  Email: <a href="mailto:tstebbins@utk.edu">tstebbins@utk.edu</a></p>		8:30 am	
The Chattanooga Engineer's Club	Lulu Coplend	Mo Minkara	February 3, 2014	Hilton Garden
Trust for Public Land	<p>Noel Durant  Chattanooga Program Director at The Trust for Public Land  <a href="mailto:Noel.Durant@tpl.org">Noel.Durant@tpl.org</a></p>	<p>Mark Heinzer  Sarah Weeks</p>	<p>March 18, 2014  Lunch</p>	DRC, 1250 Market St.
Chattanooga Construction Specifications Institute	<p>Cindi Brooks  <a href="mailto:cindibrooksgsr@gmail.com">cindibrooksgsr@gmail.com</a></p> <hr/> <p>Brian Clarke, AIA, CSI, LEED Accredited Professional  1001 Carter Street  Chattanooga, TN 37402  (423) 266-4816  cell (423) 580-5246  <a href="mailto:bclarke@dhw-architects.com">bclarke@dhw-architects.com</a></p>		<p>March 20, 2014  5:00 pm</p>	Green Spaces
Board of Realtors	<p>PHONE: 423-698-8001  VICKI TRAPP, President</p>		TBD	