Goodyear Group One

Currently there is excessive water use within the city of Goodyear, (classified as unsustainable) and it is projected that supply will soon fall short of demand when new developments are added (Strategic Plan). Our team was tasked with creating a list of policy recommendations and creating a set of standards for "best practices" regarding water use, targeted at developers that the city can hand out. In order to come up with appropriate suggestions, our team conducted broad based research through a wide array of mediums. This included stakeholder meetings, a site visit, utilization of academic articles and city documents, and the attendance of a water solutions policy summit (Waternow Alliance.) From this, we made some useful discoveries; 60-70% of water use within the city goes towards outdoor landscaping. Currently the city does not have any turf removal program in place, nor do they have a landscaping preference that they can suggest to developers. Further more, the city has no overall targeted multilevel approach to water conservation but, they are aware of the fact that they have large scale support for their preliminary tree plan (Jones, 2013) which will be discussed in more detail later. It was through the accumulation of multiple forms of research that our team was able to make these basic discoveries. We resultantly created a plan of action for our policy proposal which we designed with the idea in mind of specifically targeting three different stakeholder groups- developers, individuals and neighborhoods which are outlined in this paper.

Looking first at the developers, it became clear that a panacea approach would not be sufficient due to the differences in zoning and property types. Instead, existing and new developments should be held to different standards. We suggest that existing developments be steered towards decreasing their water use the implementation of the bracket-tier system. The bracket-tiered water pricing system encourages reductions in water use through a new format of

pricing. The basic idea is that egregious users are charged more for their water while the consumers that end up having the highest efficiency are not disadvantaged by also being held to this price increase. Rather than this method simply raising the price of water, it allows for the affluent residents to offset the price increase of the resource; "shielding poorer residents from feeling the full brunt of rate increases" (Schwartz 2015). The way the system works is simple. Consumers are charged a rate for the amount of water they use in addition to the base rate. The larger the amount used, the higher the cost will be. Its a basic bar graph with a positive correlation between price and consumption. It is important however to mention the base rate. The base rate is the flat fee charged to all homes and the absolute minimum people can be charged. This base rate is set and stays the same regardless of how much water is used. How much the base rate would be set at is a figure that the Goodyear City Council along with the City's accountant would need to figure out. The costs added to the base rate are then representative of how profligate the consumption is. Egregious users have a large fee added to their base rate, whilst efficient consumers can sometimes pay only the base rate, with no extra add-on costs. But currently, as the city uses more water, more revenue is needed and consequently, higher rates are required to generate this income. It would be unfair to punish those efficient consumers or consumers with lesser economic means who only use as much as the base rate entitles them to. If we were to instead raise the price collectively as a whole, people across the entire demographic, regardless of their water usage would be charged more for their water and this is not fair or equitable. The bracket-tiered water pricing system allows egregious users to be targeted heavily and to be so not at the expense of the other users. This ideally encouraging them to reduce their water consumption in an effort to lower their water bill. At the same time, the existing users that are more efficient and only use the base rate level, are only charged the initial rate. Considering

our research and our current available policy options, our team sees this bracket tier system as being the most equitable approach to incentivizing responsible water use.

Moving to our suggested policy relating to the "new developments", we suggest that they ought to be required to implement xeriscaping outdoors, or deal with increasing rates on turf coverage that will occur under the bracket-tiered water pricing system. Specifically, new properties will also have water priced the way current developments will have it, but they will also have a xeriscaping suggestion by the city which will be subsidized while turf coverage is not. This would be to both incentivize xeriscaping and to discourage turf installments. Furthermore, for the new developments in particular, we have developed a set of certifications the city can issue based off of the user's water use. Developers awarded platinum status would be in the group with the lowest (one percent) of water use. Gold would be the group that used ten percent or less of water compared to the average, silver would be between ten percent and twenty-five percent, bronze would be twenty-five to fifty percent and those users who used over fifty percent would not be certificate holders. None of these numbers would include storm water capture.

Our next target was individuals such as single family homes and other residential properties. Our team suggests that the city launch a public awareness campaign. We thought a good way to start such a project could be through helping people connect to their water, understand the potential scarcity of it as a resource, and change the language we use to talk about this issue as a way of including more residents in the conversation. To elaborate, we saw the idea of publicizing specific quotations about water scarcity such as *"the amount of water on earth has remained the same since the beginning of time, yet our population grows by one person every fifteen seconds"* as a useful way of increasing the level of urgency that is felt on this topic. We

also foresaw the creation and circulation of relevant "hashtags" such as #goodyearwater or #goodyearconserves as a means of increasing public awareness on this topic. Because we believe it would be strategic to bring more people into this effort and the conversation on water, at large, we also suggest a change in rhetoric, specifically the functional unit used to talk about water quantity with the public. Specifically, the language being used to talk about water is not user friendly and excludes people from the conversation who are unable to keep up with the rhetoric. An acre foot of water, or even a gallon for that matter, is difficult for the average person to visualize. Talking instead about water conservation via number of water bottles, a standard enough unit they are very familiar with, would allow for more people to understand the quantity being discussed. Imagine talking about water conservation as "bottles of water prevented from being dumped onto the sidewalk". The imagery becomes must stronger and the content easier to understand. These points make it more affective overall. Lastly, it is well known that we cannot manage what we do not measure. This makes in-home metering an important tool in tackling the task of getting Goodyear residents to decrease their water use. Through gentle shaming via smiley-face feedback on bills, people can become more attuned to the quantity of water they are consuming compared to similar households and ideally decrease their use. There is specific software that is ideal for such a project, one which will be explained in more depth later on in this paper (WaterSmart Software). Essentially though, part of the software would include an easy-to-read, and simple visual for the resident's when seeing their bill that would indicate the current status of their consumption compared to similar households in their neighborhood. This system would have five different faces. For users on the lower end of the spectrum, they would receive a display of a "happy" face while those who fell into the egregious user category would see a "sad" facial expressions. Again, these faces would be extremely easy to see and have been

proven in the past to facilitate a better understanding by the resident of their water use. The software can also provide other information like average water use for every household type in each neighborhood and information on the bracket- tier system. It has been shown that the implementation of a user friendly meter increases the satisfaction level of the user and their impression of their water utility department.

Our third and last target is the neighborhoods with the idea of making conservation fun and worthwhile for community members and we believe this can be done through providing tangible rewards and incentives. The two specific ideas our group proposes are a cash for grass program and the rewarding of individual "winning" neighborhoods that use the least amount of water (maybe per capita) with improvements/enhancements put towards the park within closest proximity (that they would have inferred ownership of). Our group saw this incentive competition as a way to include the preliminary tree plan (a plan that already has tremendous popular support) into the city wide conservation efforts. We also saw this competition as a way to increase community development and social capital by encouraging use of the shared outdoor recreational space in place of individual lawns, thereby bringing people together. This ideally also makes the "cash for grass" plan, where each square foot of turf removed entitles the property owner to a compensation check from the city (of an amount yet to be determined) and a subsidized rate on transitioning to xeriscaping, more enticing. Ideally, home owners will not mind the idea of losing their personal yard because the public outdoor park space will become more desirable to spend recreational time at anyway and the xeriscaping option will be both more financially desirable and doable, while remaining very aesthetically pleasing. While the neighborhood approach and the individual approach do have some overlap, the "cash for grass" program was placed in this category because part of the pitch to encourage the removal of

traditional lawns is dependent on there being another community space to make up for that lost asset which would be the local parks. It would be in these parks where elements of the preliminary tree plan would be implemented.

It is worthwhile to spend some time specifically explaining the preliminary tree plan that we continue to reference and some of its many benefits. Before that can be done, there is some important information to note on the City regarding its current state in relation to tree coverage. Goodyear, like other cities in Arizona must deal with high temperatures that frequently surpass 115 degrees in the summer, in part, due to the effects of the Urban Heat Island. Further more, the city feels, with popular support, that it would benefit from increasing its overall tree coverage.

Currently, tree coverage accounts for only about two percent of the cities land use and many of the plants are not being properly cared for. This is problematic as it adversely affects the health of the plant, possibly resulting in its death, and it requires the plant to inefficiently use water. This is problematic as it means that improperly cared for trees are directly in conflict with our goal of water conservation in the city. Luckily, if said trees are properly cared for, they actually have the capacity to reduce overall water use, particularly if the tree is of a native variety, well adapted to arid climates. This is a great Segway into listing the benefits that can be reaped through increasing overall tree coverage within the city.

According to the USDA Forest Service, every dollar invested in Arizona trees upfront *that are properly cared for* returns $2.23 when quantified (McPherson, et. al., 2004), making the initial expense justified. [The sub point, *if properly cared for,* is significant and will be mentioned again further in this section.] Further more, increased tree coverage is known to cool the surrounding areas more successfully than any other UHI mitigation technique, increase walkability within the city, add aesthetic benefits, prevent soil erosion, reduce air pollution,

reduce damages caused by flooding and water runoff, and increase overall property values (McPherson, et. al., 2004). Now, to go back to the sub point of proper management being a vital component, the main challenges are in educating the population about proper pruning practices for desert vegetation which is vital in order to avoid over-watering, and death of the plants that have been allotted such an investment. A potential solution is to invest a conscious effort into training municipal landscaping staff and private affiliated landscaping companies in best practices surrounding proper care of desert plants.

Returning to the Preliminary Tree Plan, two noteworthy points are that a) there is popular support for this plan among city residents (Jones, 2013) and b) the city has a goal of becoming part of Tree City USA (Jones, 2013). Taking this back to our task of decreasing water use in the city, it is important to remember that we are looking for sustainability solutions. This entails not only deducing water use, but then taking that conserved water and putting some of it towards smarter sustainability projects. To connect this to the neighborhoods and parks proposal, we are suggesting that the neighborhood with the lowest water use (within a set window of time) have trees (and maybe also three dimensional shade structures) be added to their parks. On a larger level, we see this as the water being saved in the neighborhoods essentially, being in part, reallocated to new trees resulting in a still lower net water use. Also to ensure that it is a decreased net water use, the trees that would be selected would be so out of a list of native trees as they can support full sun exposure, be able to survive without a turf environment, and provide as much shade as possible in order to cool down surrounding walkways and buildings, and reduce the overall UHI effect. Examples of such trees include the different sub-species of Acacia (White Thorn, Leather Leaf, and Black brush) and the Medium Palo Verde. Additionally, smaller

desert plants such as the agave are great accompaniments to these trees as they can further cool the surrounding areas, as well as providing an aesthetic benefit (Jones, 2013).

Mentioned earlier was the WaterSmart Software, which connects utility data and external data on water use to various stakeholders. It was mentioned as one of the many opportunities our group came across while conducting our research. Other such opportunities include the Water Index, which is provided through and created by the Kyl Center for Water Policy through Arizona State University's Morrison Institute for Public Policy; the Water Innovation Challenge-New Arizona Prize and Financing Sustainable Water through the Alliance for Water Efficiency group. These four opportunities were selected by our group because we found them to be of particular relevance to Goodyear's efforts and our proposed policies. They were also all highlighted at the inaugural Water Alliance Summit as exciting innovations in the field of water conservation and policy. Specifically, (continuing from the top) the WaterSmart Software provides a means of connecting the water utility to individual users in a significantly more comprehensive way than currently in practice. It requires the city to subscribe, and plug in their data and then, for users to plug in their own data (usually taking between two and five minutes) and from there, enabling both the user and the utility to see exactly how that user uses their water and how much water they are using in total (quantitatively) and compare that to other similar users (qualitatively). This software has proven to be successful in getting users to immediately decrease water use by an initial five percent and improve their level of satisfaction with their water utility department. (WaterSmart Software). The next opportunity highlighted is the Water Index, which is devised by the center with the intention of producing a scorecard on water resilience of cities and towns within the southwest. This score card serves as an "'at-a-glance' tool [which] will be helpful for the general public and others to more easily understand the

numerous complexities and changing dynamics of water" (Morrison). Thirdly, is the Water Innovation Challenge- New Arizona Prize that awards $250,000 to "a community-based team in an Arizona municipality that develops the most innovative and inventive market-based, technological or entrepreneurial solution to advance the sustainability of its' water future." Our team feels that if Goodyear where to implement our policy suggestions fully, or at least pass them through the council, the city would be eligible to participate in this challenge and hopefully win this substantial amount of money which could then in turn be put towards paying for these policies (cash for grass, subsidized xeriscaping, etc.) or even more ambitious projects like cutting the curb (capturing storm run off for green street infrastructure). Lastly is Financing Sustainable Water through the Alliance for Water Efficiency group. "This is an initiative created to help water managers build better rate structures that improve revenue stability, yet encourage resource efficiency. Aimed at combatting the common misperception that conservation makes rates rise and designed to provide helpful tools and data to water managers, elected officials, and consumers." This financing tool helps cities pay for projects upfront via loans they can take out with very low interest rates that can be paid back via the savings they earn through their conservation. Yet another way for them to finance some of the proposals in our policy suggestion in addition to other sustainability projects they may be looking into.

Overall, if Goodyear is serious about working to introduce policies that will enable them to reduce their overall water use, help their developers implement "best practices" with outdoor landscaping and incentivize sustainability oriented behavior, there seems to be many windows of opportunity to make that happen that are both feasible and affordable. If our team were to rank the top three suggestions in order of priority, we would encourage the city to begin with the bracket tier system, then spend efforts on WaterSmart software and lastly the "cash for grass"

and xeriscaping subsidies as these three areas seem like they will reap the greatest benefits in conservation efforts.

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