



## **Green Practices Commission**

6801 Delmar Boulevard, University City, Missouri 63130, Phone: (314) 862-6767, Fax: (314) 863-9146

# **A G E N D A** **GREEN PRACTICES COMMISSION MEETING**

**Thursday, November 11, 2021 at 5:30 – 7:00 p.m.**

**Heman Park Community Center**

**975 Pennsylvania Ave., University City, MO 63130**

- 1. MEETING CALLED TO ORDER**
- 2. ROLL CALL**
- 3. OPENING ROUND**
- 4. APPROVAL OF MINUTES:** 10/14/2021 draft minutes attached
- 5. SPECIAL PRESENTATION –** none scheduled
- 6. CITIZEN PARTICIPATION**
- 7. NEW BUSINESS**
  - a. Dark Skies Ordinance – Discussion
- 8. OLD BUSINESS**
  - a. Sustainability Strategic Plan in Draft Form – Discussion proposed to begin for Biodiversity and Energy/Emissions sections (please see attachment #1)
  - b. Geo exchange facility heating and cooling – Discussion for analysis of payback period
  - c. Emergency Climate Change Resolution/Ordinance – Discussion
  - d. Mosquito Control (spraying and larvicide application) – Discussion with update.
  - e. CTS Energy Assessment Report discussion for City Hall and Centennial Commons – please see attachment #2
- 9. COUNCIL LIAISON UPDATE**
- 10. CLOSING ROUND**
- 11. ADJOURNMENT**

Please call (314) 505-8572 or email [salpaslan@ucitymo.org](mailto:salpaslan@ucitymo.org) to confirm your attendance.



## Green Practices Commission

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### Green Practices Commission

Meeting Minutes – University City Green Practices Commission

October 14, 2021, **DRAFT**

Location: Meeting hosted on Zoom

Attendees Present: John Solodar (Chairperson), Barbara Brain, Johnathan Stitelman, Adam Staudt, Mathew Emden, Sinan Alpaslan (Staff Liaison), Stacy Clay (Council Liaison), Tim Schmalz

Attendees Absent: No absence.

1. Meeting called to order at 5:31pm
2. Agenda revised to move the Council Liaison Update to after the approval of minutes.
3. No Opening Round comments were made.
4. Approval of Minutes from May 13, 2021: Alpaslan shared screen for Commissioners' review of the minutes as written. Commissioner Brain moved to approve the minutes, seconded by Commissioner Stitelman. The motion unanimously passed.
5. No Special Presentation was scheduled.
6. No citizen comments were received for the Zoom session.
7. Council Liaison Update: Councilmember Clay updated that the Costco discussion would occur in time as Chairperson Solodar was advocating for that, as well. Mr. Clay also stated that Commissioner Staudt is appointed to the Visioning Task Force. Mr. Clay added that the 3<sup>rd</sup> Ward Revitalization Task Force was underway to be established and its member appointment process would take place in the coming months.
8. Chairman Solodar thanked Councilmember Clay for his updates and also noted that Tim Schmalz was visiting at the meeting and that he was in the queue to be nominated as a new member of our commission.
9. New Business
  - a. Geo exchange facility heating and cooling – Alpaslan updated that the Annex and Trinity Building Renovation project design was underway. A possible other related report to this topic is the Energy Efficiency Evaluation completed by CTS Group. This report accounted for the efficiency improvements in City Hall, Annex, Trinity Building and Centennial Commons. The commissioners desire to know what process applies to this item for consideration of a geo-exchange system on the ongoing Annex and Trinity Building design project. Mr. Schmalz referenced a Greenhouse Gas Inventory study that he previously completed for University City as the source of some data that could support an analysis in the matter.
  - b. Emergency Climate Change Resolution – Chairman Solodar updated that this item was initially brought up by an individual outside of University City. Commissioner Brain will draft a proposed Resolution and update the Commission in the matter.
  - c. Sustainability Strategic Plan in Draft Form – Commissioners discussed and agreed that a good approach would be to discuss the plan over the next two or three meetings and complete a review and assembly of the Commission's comments on it.



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### 10. Old Business

- a. Mosquito Control (spraying and larvicide application) – Commissioner Brain stated her willingness to split the service and implement larvaciding only and educate residents about what could be done to prevent the increase of the mosquito population. Staff and Commission will complete more fact finding on the matter from St. Louis County and bring the item back to the next meeting for discussion.
- b. Markets on Olive – Discussion deferred until a future meeting.

### 11. Closing Round

- a. Commissioner Brain stated that she would be in favor of the consideration of a dark skies regulation in University City and that she had known about the potential benefits of such a regulation in preventing any damage to wildlife. Mr. Schmalz discussed the additional benefits of that regulation as reduced maintenance, energy consumption and CO2 emissions. Dark Skies Missouri was referenced as a Missouri organization that could be a resource for further development of a proposed regulation for certain parking lot sizes and larger. Mackinac City in Michigan is a dark skies city among possibly others.
- b. Commissioner Brain proposed air quality as a presentation topic for a future meeting to include things that the Commission could do to improve air quality.
- c. Commissioner Brain shared an update on the Ruth Park Woods Renovation project. A Missouri Department of Conservation grant was approved for the project. Work groups are engaged with it on Monday and Thursday mornings and the last one was a student group of about 100 from John Burroughs School.

### 12. Adjournment 6:29pm

# University City Sustainability Plan



2021

6801 Delmar Blvd  
St. Louis, MO  
63130  
Phone: (314) 862 6767



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DRAFT

# Executive Summary

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The project focused on the creation of a new sustainability plan for University City. Through research and consultation with local experts, this plan was created to reflect the updated agenda of the citizens of University City and improve upon the previous targets of the 2012 Sustainability Plan. Jenny Wendt, the liaison for the University City Green Practices Commission and senior project manager, served as an advisor, along with Washington University in St. Louis Senior Lecturer Raymond Ehrhard to the two teams of Sustainability Exchange students.

In the Fall of 2020, a team of students created the foundation and background for the proposed University City Sustainability Plan. They divided the sustainability plan into six sections: Biodiversity, Energy & Emissions, Food Access, Waste & Materials Management, Healthy Transport, and Water & Green Infrastructure. Over the course of the Fall 2020 semester, they completed the Energy & Emissions and Water & Green Infrastructure sections. Additionally, they created transition materials to assist the Spring 2021 team in completing the remaining four sections of the sustainability plan.

During the Spring 2021 semester, the four remaining sections were completed, and all findings are summarized in this final report. Each section of the sustainability plan includes two to three main targets, along with a brief explanation of how they will be met. Relevant hyperlinks to additional information and resources are included throughout.

The finalized plan will be delivered to the University City Green Practices Commission and will be reviewed before implementation.

— *Sustainability Exchange Teams*

# Why Create A Sustainability Plan?

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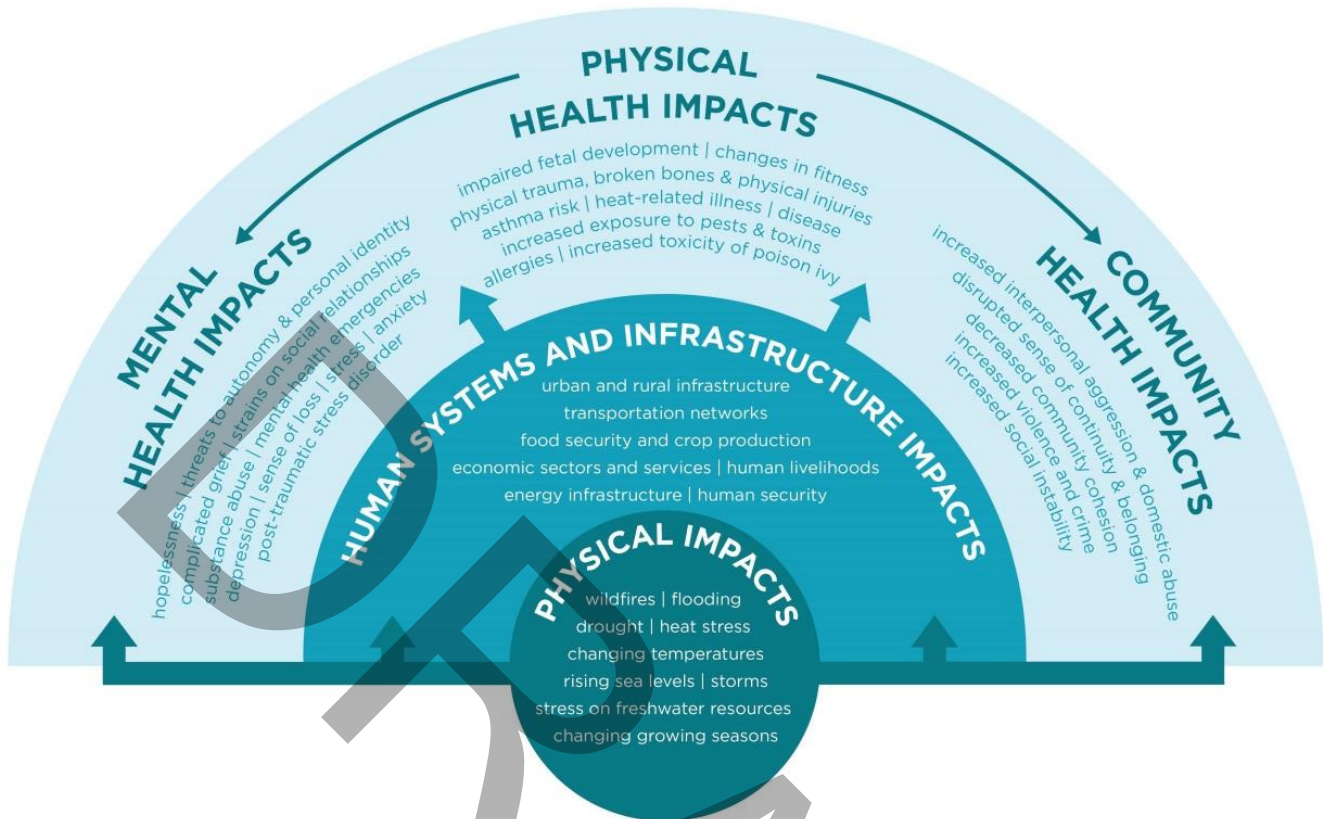
As members of the Green Practices Committee of University City, we believe that economic, environmental and social well-being (commonly known as the triple bottom line) are inextricably connected. In order to promote the quality of life of community members now, and for future generations, it is our duty to use available science, best practices, and partnerships to act as responsible stewards of the environment. In the age of globalization, we believe that local behavior and global welfare are linked: *this requires that we think globally, as we act locally.*

With these principles in mind, the Mission of the Green Practices Committee of University City is as follows:

“to encourage sustainable practices and programs that improve the health and quality of life of our community; restore and protect our natural resources; and strengthen our economy. It is widely recognized that there are local and global issues that threaten our ability to ‘meet the needs of the present without compromising the ability of future generations to meet their own needs’ (1987 Brundtland Commission). Therefore, it is imperative that we become sustainable, as individuals, as a community, and as a City”.

We are not simply acting out of principle. [Research](#) shows that, in the face of climate crisis, strategic sustainability efforts promote robust, equitable [economic development](#) and resilient [community health](#). A key [study](#) on the effects of climate change on mental, physical and community health show that public health and climate change effects are inseparable, and therefore must be dealt with simultaneously.

As climate change becomes more pressing each day, creating a plan is more vital now than ever. The [2017 EPA Midwest Climate Change](#) snapshot identifies the ways that climate change is already impacting the region, and how those impacts will amplify overtime. Overall, temperatures have already accelerated, leading to heavy rains alternating with very dry periods. This could lead to property damage, overflowing rivers and overwhelmed sewage systems, crop yield loss, and increased disease transmission. Additionally, increased temperatures pose risks to human health, from reduced air quality to increased allergens, to even more deaths from extreme heat waves.



**Health Impacts Due to Climate Change** - Effects of Climate Change impact the three main factors of health shown in this figure. These impacts affect People of Color, people in poverty, people with disabilities, women and people in rural areas more so than others as they do not have as many resources to combat the negative health effects of climate change. Image Source: Clayton, Susan, Christie, Manning, and Caroline Hodge. "Beyond Storms and Droughts: The Psychological Impacts of Climate Change." American Psychological Association, June 2014.

Additionally, as detailed in a recent report titled, "[Environmental Racism in St. Louis](#)," black residents in St. Louis are far more likely to suffer from energy burdens, food deserts, lead poisoning, asthma, air pollution, trash dumping, and vacant lots, than white St. Louisans. By creating a Strategic Sustainability Plan, we hope to further our local efforts and regional efforts towards ameliorating this disparity and uplifting environmental justice initiatives. *By creating, and actively engaging with, the University City Strategic Sustainability Plan, University City can act as a model for relieving environmental injustices through ongoing efforts for equitable sustainable development.*

In order to be a part of the global solution, we are focusing on the issues of biodiversity, energy and emissions, food access, waste and materials management, healthy transport, and water and green infrastructure, in hopes to enable the City and all of its constituents to have access to the means to improve their own wellbeing, as well as the wellbeing of the people, planet and community we have all grown to share and love.



# Biodiversity

## ***Why It Matters?***

Fostering biodiversity in University City benefits both human and environmental health. Connecting residents to nature can give a reprieve from daily stresses and [improve quality of life](#). Preserving and restoring green space not only makes the city beautiful but protects natural ecosystems, flora, and fauna.

## **Target 1: Connect residents to the various natural spaces and their neighborhoods in University City**

### **Collaborate with groups and organizations to create educational content**

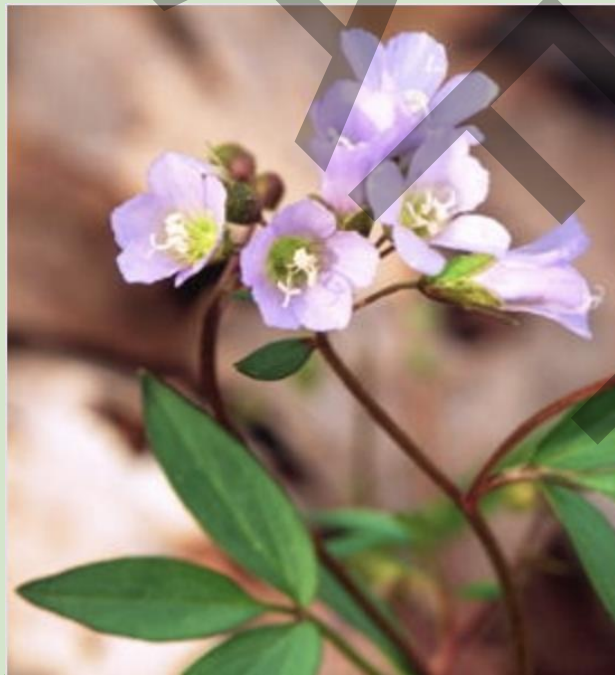
- Establish [programs](#) that connect youth and families to the surrounding wildlife and green spaces in the City
  - Work with the Missouri Botanical Gardens and Missouri Department of Conservation to promote a healthy, biodiverse community
  - Provide resources such as [Grownative](#) about promoting native plant species through platforms such as NextDoor and the City website
- Partner with surrounding organizations to develop content promoting the economic and health benefits of [tree canopies](#)
  - Use the [Columbus](#) and [Kansas City](#) initiatives to articulate the benefits of tree canopies
  - Create material that highlight the benefits of vegetation prevents erosion and improves the quality of surface and ground water

## **Did you know?**

The [Missouri Botanical Garden](#) hosts nearly 1,000,000 visitors a year

## Engage residents with ways they can promote biodiversity in their community

- Promote conservation from home programs with the assistance of the [Audubon Society](#)
  - Assist residents in removing grass and planting native gardens while reducing herbicide and pesticide use
- Develop workforce training programs for residents to restore and protect natural resources that lead to resident employment while actively avoiding community displacement
  - Advertise paid opportunities such as the [Youth Conservation Corps](#) that allow people to get experience while working directly on projects
  - Establish [community projects](#) with partner organizations that provide educational aspects while helping residents restore their surrounding green spaces
  - Remove [invasive species](#) along waterway buffers, replant with native species, and increase resources for management and maintenance expanding on previous initiatives in the 2012 University Sustainability Plan



An image of the native Jacob's ladder

*GrowNative*

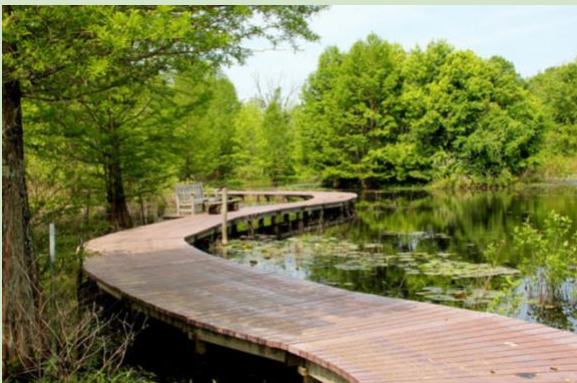
## Target 2: Promote the planting and protection of species native to University City and the state of Missouri

### Create “education gardens” full of native species in public green space

- Educate the public on the both the beauty and importance of native species
  - Work closely with [GrowNative](#) to plant appropriate native species that benefit local wildlife and pollinators
  - Refit eco-urban parks with native plant species
  - Use the education garden as a learning opportunity for schools, youth groups, and summer camps

### Protect native species and critical habitat areas

- Encourage sustainable land management practices
  - Develop and implement organic land care policies to use safer and non-chemical alternatives
  - Work with businesses to reduce sale of invasive species
  - Monitor the presence of invasive and non-native species in green space
- Create a clear path for those seeking to participate in transforming city green space
  - Prioritize funding for projects lead by people of color
  - Develop programs for residents to restore and protect natural resources



A path in Shaw Nature Reserve

[Great Missouri Birding Trail](#)

### Did you know?

Missouri Botanical Garden’s plant finder is a great resource to find Missouri native plants that meet your needs

## Target 3: Ensure green space most effectively serves the needs of residents in the City

### Conduct an open space assessment to categorize green space in the City

- Identify and designate the [purposes](#) for all potential corridors and green spaces
- Identify the [stressors](#), potential threats and protect natural resource and critical habitat areas
  - Create remediation strategies to mitigate stressors and maximize the natural life in the City
- Develop mandatory buffers for areas that can impact a surface watercourse
- Consult with [experts](#) to determine needs of each green space

### Create ordinances to preserve the trees on private property

- Promote planting of trees and establish tree [protection](#) standards
  - Partner with organizations in the area to establish [adopt-a-tree](#) programs
- Fines for violating tree-property [requirements](#) such as chopping, damaging, and otherwise harming trees in the City
  - Require [replacements](#) when trees are damaged or removed

### Establish a baseline of the current status of open green spaces in the City that is to be improved upon in the upcoming Sustainability Plan

- Create tangible ways to [measure](#) progress towards goals and establish milestones in sustainability plan
  - Establish short-term and long-term [greening](#) efforts that transform the City
  - Prioritize funding for projects led by [neighborhoods](#) that focus on the individualized needs of the community members
- Ensure all decisions and baselines are grounded in an [equity lens](#) that calls for connections and interactions between people and nature to be made with the intentional integration of sustainability and social justice

# Energy and Emissions

## ***Why It Matters?***

As a precursor in the transition to renewable energy, improving energy efficiency is an imperative, affordable first step. By reducing GHG emissions, ameliorating the energy burden, and saving money overall, energy efficiency can engender a climate-resilient University City.

## Target 1: Improve Community Energy Education

Provide relevant energy resources to University City residents and businesses to generate savings, ameliorate the energy burden, and reduce greenhouse gas emissions and pollution

- Solar and Renewables Resources: [Grow Solar STL](#), Rooftop Wind Turbines via [Midwest Green Energy](#), [Arcadia](#), DOE Property Assessed Clean Energy Programs ([PACE](#)) in accordance with [Ordinance No. 6998](#), [Ameren Community Solar Program](#) & [Neighborhood Solar Program](#)
- Energy Efficiency: Federal Tax Credit for Solar PV ([DOE](#)), Ameren Energy Efficiency rebates for residential and [commercial buildings](#), [Spire gas rebates](#), MO DOE Energy Loan [Program](#)
- Energy Burden: Missouri DNR Low Income Weatherization Assistance Program ([LIWAP](#)), [CAASTLC](#) utility restoration services

## **Did You Know?**

The University City Hall renovation received LEED certification in 2008.



University City Hall post-renovation

[Architect Magazine](#)

## Target 2: Update Municipal Energy & Energy Efficiency Policies

### Find a baseline of energy usage and efficiency

- Employ online energy auditing and reporting software, such as [Dude Solutions Energy Manager](#), an updated Energy Star Portfolio, or [ClearPath](#) to facilitate energy benchmarking

### Create a greenhouse gas reductions target

- Set benchmarking goals based on reasonable targets (See [EPA GHG reduction implementation program](#))
- Enforce a benchmarking deadline on all municipal buildings
- Utilize the US Green Building Council Missouri Gateway Chapter: [Resources for Local Governments](#)
- Explore financing options for example, Guaranteed Energy Savings Contracts ([MO Statute 8.231](#))

### Update International Energy Conservation Code (IECC)

- Adopt 2018 or newer IECC code
- Utilize [DOE resource](#) to facilitate code update

### Consider creating an integrated policy for energy efficiency and greenhouse gas reductions

- See 2007 St. Louis City [Ordinance N. 67803](#)

### Did You Know?

The University City fire stations #1 and #2 have both had all of their lightbulbs switched to LEDs in 2018.



University City Fire House 1

[ArchImages STL](#)

## Target 3: Become a Solar and EV-Ready City

### Complete application for [SolSmart](#) certification to remove barriers to solar implementation in University City

- Create a website outlining solar certification process for University City

### Create and adopt a Solar-Ready Ordinance

- Adopt a solar-ready ordinance similar to the recent St. Louis City Solar-Ready Ordinance (N.71063)

### Make University City Electric Vehicle Ready

- Install public use car charging stations in strategic areas using [economic development retail sales tax funds](#) in conjunction with [Ameren rebates](#)
- Promote Ameren rebates to businesses to install electric car chargers

### Did You Know?

University City was the first city to have an all-electric fleet of city vehicles!



Solar Array found at Washington University in St. Louis

*WashU Sustainability*

# Food Access

## ***Why It Matters?***

Food insecurity decreases cities' ability to develop their economies and agricultural markets. Unhealthy and insufficient meals can contribute to poor behavior and performance at work and in school. Thus, access to healthy, nutritious, quality food is crucial to the efficient functioning of a society with impacts ranging from economic growth to job creation.

## **Target 1: Educating residents and specifically youth on nutrition, cooking, gardening and food waste**

### **Begin healthy food choice education at the elementary level**

- Integrate school gardens into pre-K-12 curriculum and use as a learning platform to educate students on growing locally and nutrition
- Educate parents on food choices and long term healthy
- Offer local, healthy food options in school cafeterias
- Establish community gardens next to schools and use them to educate children

## **Did You Know?**

The 2012 University City Sustainability Plan didn't have a food access section!



Fresh thyme, a natural food marketplace that feeds your body without feasting on your wallet.

*freshthyme.com*



## Target 2: Addressing and reducing the cost of healthy foods and incentivizing their purchase

### Make farmers markets and other local food access systems readily available to everyone

- Partner with the Midwest Associations of Farmers Markets and local Farmers Markets in University City
- Facilitate and expand the use of WIC/EBT payment to all farmers markets
- Encourage more local farmers as vendors and facilitate cultural events around local food and recipes
- Organize food festivals and events that cater locally grown food to connect the community to farmers

### Make healthy food options more convenient and affordable than unhealthy food options

- Limit the number of unhealthy food establishments per capita while increasing the number of healthy food establishments
- Encourage healthy food options over unhealthy food options by developing fresh produce vouchers to incentivize their purchase
- Develop full-service grocery stores and co-ops near places of work and residence that offer local food

### Did You Know?

The University City District Farmers Market has been accepting EBT since 2008!



University District Farmers Market accepts EBT.

*line.17qq.com*

## Target 3: Promoting and growing spaces that connect communities with healthy foods

### Connect food growers with direct consumers

- Encourage community supported agriculture (CSA) programs where community members can purchase shares of healthy foods directly from local farmers
- Organize food festivals and events that cater locally grown food to connect the community to farmers

### Connect the whole community to healthy foods

- Establish community gardens next to senior living facilities and partner with them to educate them and use their help
- Collaborate with religious establishments, groups and community centers to distribute foods from urban farms

### Did You Know?

University City currently does not have any community gardens, but the greater St. Louis area has over 200!



One of the two thriving community gardens that Skinker DeBaliviere is home to.

*skinkerdebaliviere.com*

# Waste & Materials Management

## Why It Matters?

Every person in University City creates material waste and relies on the city's management of their trash and recycling. Promoting responsible recycling and waste management practices will benefit the environmental health of the city and its people and can even bring financial benefits to the city and consumers.

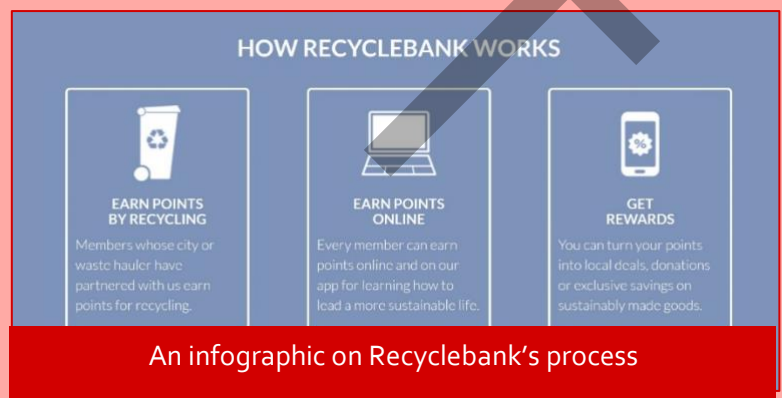
## Target 1: Provide material incentives for residents who reduce waste and recycle

### Partner with a recycling incentive program, such as Recyclebank

- Incentive programs effectively promote responsible waste management without imposing higher costs and penalties for improper behavior
- Recyclebank verifies reported green activities by residents and partners with businesses to provide gift cards and discounts
- [How to join FAQs](#)
- [How it works and why it helps](#)
- Recyclebank can help save the city money: within one year, Hollywood Fl. (pop. 150,000) saved over \$500,000 on waste disposal fees and increased recycling tonnage by over 130%

## Did You Know?

University City began offering curbside recycling in 1974, making it one of the first municipalities in the country to do so!



Recyclebank.com

## Target 2: Promote Recycling from construction/commercial sources

### Implement a requirement for corporate recycling based on volume

- Follow the blueprint from California's Mandatory Commercial Recycling measure
- This requires businesses with 4+ cubic yards of solid waste per week or a multifamily residential dwelling of 5+ units to set up recycling services
- Four provisions are offered to manage the recycling and divert solid waste from recyclable products: self-haul, subscribe to a hauler, arrange for recycling pickup, or subscribe to a recycling service

### Require any event that uses a city permit to provide recycling

- Require special events that use a city permit to provide recycling services for attendees

### Enforce a ban on construction and demolition waste

- Remove the disposal of hazardous or otherwise valuable materials from landfills
- Include materials such as asbestos, asphalt pavement, brick, concrete, metal, wood, and gypsum wallboard (drywall)

**N.B. These bans or requirements could be modified into incentive programs that reward citizens for avoiding these undesirable behaviors**

## Did You Know?

Located at the Heman Park Community Center, University City operates a 24-hour recycling drop off center that even accepts items like textiles!



Valuable materials and metals can be recovered from construction wastes

*soa-inc.com*

## Target 3: Educate residents on the value of reducing, reusing, and recycling

### Implement a requirement for corporate recycling based on volume

- Follow the blueprint from California's Mandatory Commercial Recycling measure
- Work with local schools to educate students and encourage them to share their knowledge with their families
- Distribute [learning materials from the EPA](#), including project ideas, curriculums, and more
- Utilize resources from the Missouri Recycling Association targeted to [Elementary](#), [Middle School](#), and [High School](#)
- Advertise opportunities for advanced waste management like composting and electronics recycling
- If an incentive program from Target 2 is implemented, create educational materials and distribute to residents
- Educate residents and businesses on any policies from Target 3 that are enacted

### Bonus Target: Explore a return to dual stream recycling

- Like many places across the country, University City started as a dual stream recycling program and consolidated to single stream
- However, dual stream offers many potential benefits, including the following
  - Overall higher recycling rates, especially of valuable aluminum and steel
  - Higher price per ton of material sold
  - Comparable cost to single stream despite dual stream programs often located in less populous areas
  - Less glass breakage
  - Lower processing costs
- These potential benefits offer enough incentive to explore moving on from the simplicity of single stream recycling

# Healthy Transport

## ***Why It Matters?***

Transportation decisions are an integral part of the daily lives of all University City residents. Thus, promoting mixed-use development along with active & shared transport options can help create a healthier, livelier, and more equitable University City. Our approach to transportation planning extends beyond the built infrastructure to engaging the community to reflect on and transform their own travel habits, as well as their perception of public spaces.

## **Target 1: Implement Transit-Oriented Development and Expand Supporting Infrastructure**

### **Maintain and supplement transport initiatives outlined in the [Bike & Pedestrian Master Plan](#)**

- Promote high-density, mixed-use development around commercial districts (i.e., Olive Boulevard), regional transit stations (i.e., University City-Big Bend Metrolink), and other revitalization projects
- Enhance transportation equity for all residents by improving the conditions and [accessibility](#) of sidewalks
- Improve pedestrians' and cyclists' safety and comfort on major arterial roads by:
  - Increasing the frequency of [signal-controlled crosswalks](#) and pedestrian islands
  - Increasing the visibility and clarity of traffic signs and road surface markings (i.e., [switching from "Share the road" to "Cyclists may use full lane"](#))
- Promote multimodal usership by:
  - Implementing [NACTO design guidelines](#) for complete streets, traffic calming measures, pedestrian & cyclist facilities, and other streetscape enhancements
  - [Sheltering bus stops](#) and enhancing transit security
  - Investing in [end-of-trip facilities](#) in areas with high potential demand (i.e., large supermarkets)

Adopt and enforce a form-based code in lieu of traditional zoning to reduce inefficient separation of land uses and preserve community character and assets

Inform community members about urban mobility and engage them in long-term transportation planning

- Report regularly on the implementation progress of the Bicycle & Pedestrian Master Plan, including active and planned projects:
  - Create and maintain a [real-time map](#) of the developed pedestrian and cycling infrastructure or a [travel planner](#) on the City's website
  - Inform community members about completed projects through NextDoor as public outreach
- Conduct a [community needs and mobility equity assessment](#) through:
  - Informal surveys/polling distributed on NextDoor or the City's website
  - or the ETC Institute methodology applied in the City's [2019 community-wide survey](#)

## Did You Know?

University City adopted its [Complete Streets Ordinance](#) on June 5<sup>th</sup>, 2012.



NACTO Complete Streets

NACTO

## Target 2: Promote Active Living & Change Individuals' Travel Habits

### Increase incentives for public and non-motorized transportation usage

- Subsidize [bus](#) and [metro](#) passes to encourage and increase the use of public transportation
  - Billing platforms such as Ventra may allow employees to use [pre-tax](#) dollars to pay for transportation costs
  - Provide specialized discount rates based on need or status (i.e., veterans, the elderly, below certain income threshold)
- Engage local businesses to [reward](#) customers who arrive on public transportation, foot, or bikes:
  - Businesses can post local deals associated with alternative transport use on NextDoor Businesses
  - Businesses can offer reward programs or small redeemable gifts for alternative transport use
- Reduce and replace individual parking spots in commercial areas with [rideshare](#) (i.e., Uber, Lyft) spots

### Target enforcement of motor vehicle regulations to legitimize multimodal usership

- Enforce speed limits around areas designed for high pedestrian and cyclist activity
- Switch police car patrols to bike patrols to increase visibility and set a role model
- Increase usage of no-idling signs and encourage limiting [idling](#) in cars
  - Potential campaigns like the [MORPC](#) Air Quality Program

### Increase programming that promotes daily exercise, the outdoors, and active transport (i.e., biking, walking) in health and education centers

- Conduct [share the road](#) campaigns and increase public outreach programs that teach [hand signals](#), safety precautions, traffic laws, and road signage
- Create educational material that informs residents of the [health](#) and [economic](#) benefits associated with using active and public transportation:
  - Disseminate information through NextDoor and other social media platforms



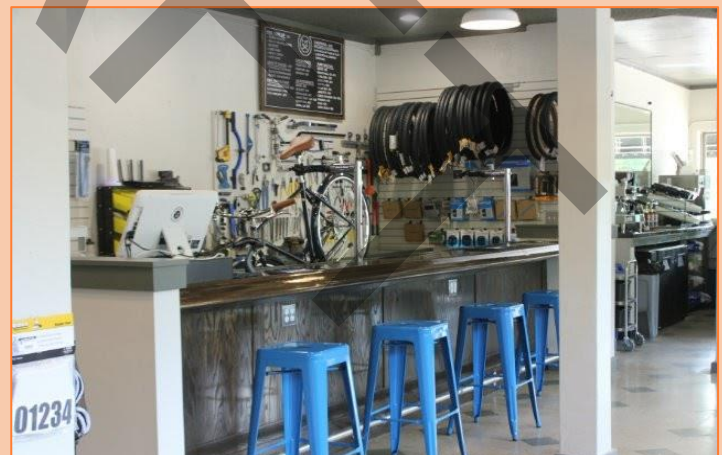
## Target 3: Activate and Reclaim Public Spaces

### Engage the public in placemaking to bring vibrancy, a unique identity, and a sense of community to shared spaces

- Use [charrettes](#), [visual preference surveys](#), [design contests](#), and chalkboard walls to allow community members to redesign urban spaces
- Inform community members regularly about event programming within the City through NextDoor and conduct informal polling to collect public suggestions
- Organize and co-facilitate [pop-up demonstration projects](#) to raise awareness and engage community members in temporarily transforming public spaces to activity-oriented destinations such as:
  - Transforming a street into a pedestrian mall with a farmer's or flea market and engage local businesses to participate
  - Allowing residents to draw their own on-street bike facilities on low-volume and low-speed residential streets
- Study and implement other best practices described by the [MSU Land Policy Institute](#), [Project for Public Spaces](#), [NYC Criminal Justice](#), and the [Future Place Leadership](#).

### Did You Know?

University City is staying active with weekly runs organized by [Big River Running Company](#)



Cursed Bike & Coffee Shop in University City

*Cursed Bike & Coffee STL*

## Beautify the streetscape and encourage neighborly interactions through design

- Convert vacant, publicly-owned parcels into [parklets](#), [temporary art installations/murals](#), [community gardens](#), [event venues](#), or [parking spots for pop-up stores and food trucks](#)
- Increase outdoor seating area along commercial corridors (i.e., Olive Boulevard) and provide [movable, stowaway seating](#) in public plazas
- Install interactive games or art, culture, and educational installations in public spaces and along streets with high foot traffic

### Did You Know?

Parking spaces on the Loop were [temporarily transformed into parklets](#) on September 20<sup>th</sup>, 2019.



University City Loop Ice Carnival

*The University News*

# Water & Green Infrastructure

## ***Why It Matters?***

Ensuring the health of our natural water basins is important for maintaining the quality of our lakes, rivers, and streams and providing benefits to our health, local economy, and wildlife. Even though University City is not high susceptibility for droughts currently, a changing climate will require everyone to make responsible use of their water supply. Furthermore, water use reduction strategies work to reduce monthly water and energy bills for residents and businesses.

## **Target 1: Improve Stormwater Management in University City and Water Quality of River des Peres**

Maintain a list of active land disturbance projects. Develop procedures to control stormwater runoff as informed by the [St. Louis County Phase II Stormwater Management Plan MCM 4, MCM 5, and MCM 6](#), including:

- Erosion control and stormwater solution Best Management Practices (BMPs) (e.g., rain gardens, permeable pavement, detention ponds) outlined in the University City Sustainable Development Guidelines, [MSD Landscape Guide for Stormwater Best Management Practices](#), and [MSD Site Design Guidance](#)
- Site inspections before, during, and after project as specified in land disturbance program
- Mechanisms to receive, respond to, and track public inquiries and complaints using Google Forms or another commonly available software
- Enforcement actions for developers

## **Did You Know?**

You can see BMPs in practice in University City by checking out the rain gardens at Lewis Park and bioretention basins at Millar Park and Fogerty Park.



Rain gardens near sewers are one example of a BMP used to minimize strain on stormwater systems

[MSD Site Design Guidance](#)

## Raise community awareness of stormwater pollution and water quality

### issues:

- Conduct outreach to trade associations, schools, and watershed groups
- Organize at least one annual cleanup event
- Post pet waste signs in parks along with garbage cans
- Label all storm drains and BMPs
- Encourage citizens and businesses to limit flow to sanitary sewers during storms and empty downspouts onto property, not into sewers
- Delineate "Flood Plain Zone" and outlaw storage of materials and debris that could wash into the river
- Implement Early Warning System to give residents notice before a flooding event with use of rain gauges that provide real-time weather data accessible by cell phone application
- Apply GIS data to provide fair warning and education materials to renters/homeowners that lease or purchase a home in the flood plain of River des Peres
- Advertise opportunities for businesses, organizations, and residents to receive [funding and support](#) from Missouri Botanical Gardens and MSD Project Clear for rain-scaping projects

### Did You Know?

Lions Against Litter is a University City group that meets once per month to clean up debris in our riverbanks, parks, and other public areas. To get involved, check out their [Facebook page](#).



The University City Trash Bash is an annual event to foster community involvement in water quality issues

[Greatriversgreenway.org](http://Greatriversgreenway.org)

## Maintain data to track information relevant to stormwater pollution and water quality, including:

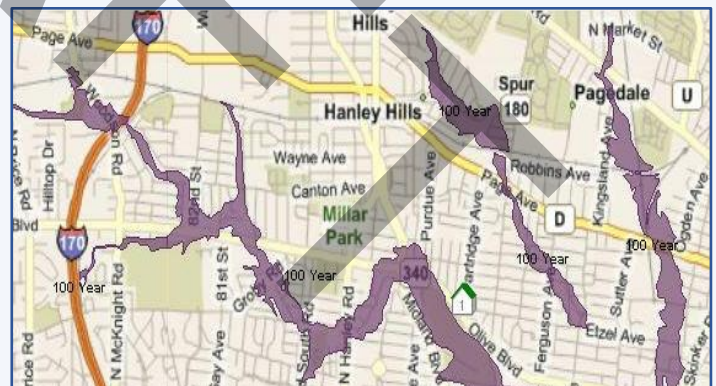
- Location of individual sewage disposal systems to aid with illicit discharge investigations
- Residential locations participating in sewer lateral repair program
- BMPs implemented by University City or construction contractors
- Salt application rates in winter to inform use of alternate deicing approaches where feasible
- Action item recommendations for Flood Risk Management Study conducted by the US Army Corps of Engineers
- An inventory of past maintenance actions conducted on River des Peres (e.g., dredging, buyout structural changes, detention area construction)

## Did You Know?

The River Des Peres Watershed Coalition, formed in 2002, was the very first watershed-based organization in St. Louis County.

## Maintain written programs and guidelines for the following municipal duties:

- Proper disposal of waste from Small MS4s
- Assessing water quality impacts for new flood management projects
- Spill prevention, control, and management of paints, solvents, petroleum products, and petroleum waste products (except fuels)
- Annual training on stormwater pollution/good housekeeping protocols for municipal staff
- A comprehensive University City Stormwater Master Plan



Flood zones of River des Peres

[Archcityhomes.com](http://Archcityhomes.com)

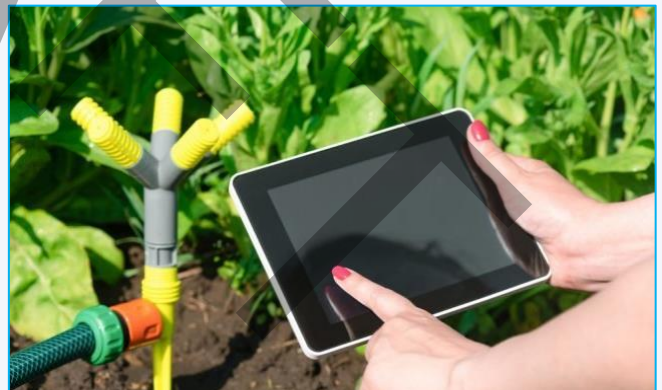
## Target 2: Decrease Potable Water Use 20% by 2025

### Educate citizens and encourage community involvement:

- Develop outreach campaigns aimed at encouraging responsible water use
- Educate businesses about [MSD Non-Sewered Water Credit](#), which rewards businesses that divert some of their water from the sewer system
- Provide education materials to ensure that residents understand how to read their water bill, as well as steps they can take to lower their cost
- Support competitions with incentives for neighborhoods, businesses, or other institutions that accomplish the most to decrease water use

### Implement water reduction strategies on municipal properties where applicable, and encourage similar measures by University City organizations and citizens:

- Install rainwater collection systems such as rain barrels, rainwater tanks, and cisterns to store for future use or donation to community gardens
- Plant native species that are tolerant of local soil and precipitation levels
- Improve indoor water efficiency by installing [EPA WaterSense](#) efficient plumbing fixtures including low-flow toilets and urinals, sinks, showerheads, dishwashers, and washing machines while considering rebate programs for citizens and businesses
- Install [weather-based controllers](#) on irrigation systems and water-efficient landscaping in parks and on municipal building properties



Weather-based irrigation systems use current forecasts to determine when to activate, saving water

[Bobvila.com](http://Bobvila.com)

## Did You Know?

For more than 30 years, University City has been honored as a Tree City USA, which means it has met urban forestry goals set by the National Arbor Day Foundation and the National Association of State Foresters.

### Adjust municipal protocols to decrease water usage and ensure safe drinking water quality in University City:

- Ensure accurate water metering at all service connections, including public use water
- Implement program to identify water leaks using metering data, and educate residents on seeking water leaks and reporting them to University City
- Investigate feasibility of gray water recycling systems in University City, as described in the International Plumbing Code, 2012 edition
- Ensure quality and prevalence of drinking fountains and discourage the use of bottled water
- Implement program testing for lead and other water quality degradation that could be occurring in older homes and schools due to premise piping

## Did You Know?

University City fully considers the harmful effects of road salt application on our waterways. For the past five years, there has been a consistent downward trend in salt usage in the River des Peres watershed region.



Buildings with aging water infrastructure may experience lead piping corrosion, so regular testing is important

*Source: wustl.edu*

DRAFT



Overall Report Comments:	Refer to the OneSTL Sustainability plan and the framework in which this plan was created.
	Remove links and references to other cities frameworks used as examples, remove links to pertinent info and/or reference specific programs in a footnote or other reference type
	Add avenues for outreach, including digital message boards

**Biodiversity**

Target/Strategy		Comments
1	Connect residents to various natural spaces and their neighborhoods in University City	BB: Overall this section needs an increased focus on education on why biodiversity matters.
	Collaborate with groups and organizations to create educational content	
	Engage residents with ways they can promote biodiversity in their community	More focus on the Bring Conservation Home program
2	Promote the planting and protection of species native to University City and the state of Missouri	Remove "University City" - keep ...native to the State of Missouri...
	Create "education gardens" full of native species in public green space	
	Protect native species and critical habitat areas	Currently no gardening sales in University City, so the section regarding sale of invasive species, should this be kept for future reference or removed?
3	Ensure green space most effectively serves the needs of residents in the City	
	Conduct an open space assessment to categorize green space in the City	
	Create ordinances to preserve the trees on private property	Replace with: Encourage/promote preservation of trees. "Partner with organizations in the area to establish adopt-a-tree programs" needs to be in a different location within the document or removed. Need reference to forestry permit and policy Remove "Fines for violating tree-property requirements..." or adapt it accordingly (fines for removing city trees? Look into forestry code)
	Establish a baseline of the current status of open green spaces in the City that is to be improved upon	
		Add something about tree-topping and how it's detrimental to trees
		Add a section about % tree cover and it's overlapping importance

**Energy and Emission**

Target/Strategy		Comments
1	Improve Community Energy Education	
	I.e. Solar and Renewables Resources: Grow Solar STL, Rooftop Wind Turbines via Midwest Green Energy, Arcadia, DOE Property Assessed Clean Energy Programs (PACE) in accordance with Ordinance No. 6998, Ameren Community Solar Program & Neighborhood Solar Program, Ameren and Spire rebates, DOE Energy Loan Program	
2	Update Municipal Energy & Energy Efficiency Policies	
	Find a baseline of energy usage and efficiency	
	Create a greenhouse gas reduction target	
	Update International Energy Conservation Code (IECC)	
	Implement University City's integrated policy for energy efficiency and greenhouse gas reductions	Include details of this ordinance within the plan for clarity - as in specifically writing the details of the ordinance into the plan. (plus link is not working)
3	Become a Solar and EV-Ready City	
	Complete application for SolSmart certification to remove barriers to solar implementation in University City	

		Create and adopt a Solar-Ready Ordinance	
		Make University City Electric Vehicle Ready	
			Add a section about emissions and air quality and how asthma is prevalent (particularly in regards to disproportionately effect low income communities)

**Food Access**

Target/Strategy			Comments
1		Educate residents and specifically youth on nutrition, cooking, gardening, and food waste	Remove "Did You Know" section about community gardens. This is incorrect - University City has at least 3, maybe more, through Gateway Greening.
		Begin healthy food choice education at the elementary level	
2		Address and reduce the cost of healthy foods and incentivizing their purchase	
		Make farmers markets and other local food access systems readily available to everyone	
		Make healthy food options more convenient and affordable than unhealthy food options	
3		Promote and grow spaces that connect communities with healthy food	
		Connect food growers with direct consumers	
		Connect the whole community to healthy foods	

**Waste and Materials Management**

Target/Strategy			Comments
1		Provide material incentives for residents who reduce waste and recycle	Add a section about the Green Dining Alliance and promoting it to other restaurants (including no styrofoam)
		Partner with a recycling incentive program, such as RecycleBank	
2		Promote Recycling from construction/commercial sources	
		Implement a system for corporate recycling based on volume	
		Require any event that uses a city permit to provide recycling	
		Reduce landfilling of construction and demolition waste	
3		Educate residents on the value of reducing, reusing, and recycling	

**Healthy Transport**

Target/Strategy			Comments
1		Implement Transit-Oriented Development and Expand Supporting Infrastructure	Add information about bus routes, remove reference to U City Big Bend Metrolink as it is not a good example of transit oriented development, focus on transit oriented development around bus routes
		Maintain and supplement transport initiatives outlined in the Bike & Pedestrian Master Plan	
		Adopt and enforce a form-based code in lieu of traditional zoning to reduce inefficient separation of land uses and preserve community character and assets	
		Inform community members about urban mobility and engage them in long-term transportation planning	

2	Increase incentives for public and non-motorized transportation usage	
	Target enforcement of motor vehicle regulations to legitimize multimodal usership	
	Increase programming that promotes daily exercise, the outdoors, and active transport (i.e., biking, walking) in health and education centers	
3	Activate and Reclaim Public Spaces	
	Engage the public in placemaking to bring vibrancy, a unique identity, and a sense of community to shared spaces	
	Beautify the streetscape and encourage neighborly interactions through design	

**Water & Green Infrastructure**

<b>Water &amp; Green Infrastructure</b>		<b>Comments</b>
	<b>Target/Strategy</b>	
	Improve Stormwater Management in University City and Water Quality of River des Peres	
	Maintain a list of active land disturbance projects. Develop procedures to control stormwater runoff as informed by the St. Louis County Phase II Stormwater Management Plan	Elaborate on the MCMs and the MS4 program
	Raise community awareness of stormwater pollution and water quality issues	
	Maintain data to track information relevant to stormwater pollution and water quality	
	Maintain written programs and guidelines for municipal duties	
	Decrease Potable Water Use 20% by 2025	How was this number determined? From Missouri American Water? Need to determine this % based on data.
	Educate citizens and encourage community involvement	
	Implement water reduction strategies on municipal properties where applicable, and encourage similar measures by University City organizations and citizens	
	Adjust municipal protocols to decrease water usage and ensure safe drinking water quality in University City	



## **Preliminary Infrastructure & Energy Assessment Report for a City Wide Guaranteed Energy Performance Contract**

**July 6th, 2021**

This response, along with any documents, files, or attachments, is intended only for the use of the addressee(s) and contains confidential and legally privileged information. You are hereby notified that any dissemination, distribution and/or copying of the information contained in or attached to this Report is strictly prohibited without the written approval of Control Technology and Solutions, LLC.

## Executive Summary

The Facilities and Maintenance Team mission is to provide a safe, functional, clean, and welcoming environment through the completion of all custodial and routine interior and exterior property maintenance for University City. This department is responsible for all aspects of building operations and maintenance of the buildings owned and operated by the city. This includes coordination and supervision of building repairs, performing routine property renovation, and managing energy consumption.

CTS has prepared this preliminary report that has identified various strategies available to University City that will aid in lowering future capital investments and the operational and energy costs at each of their facilities, all while improving the quality of the indoor working environment and preserving previous capital investments.

CTS has evaluated four (4) buildings operated by the city. The utility analysis included three (3) buildings, with the Trinity Building not being included in the total due to lack of information. The baseline electricity usage across the three (3) buildings is 1,671,780 kWh/yr and the cost is \$141,247/yr. The average blended unit cost of electricity is \$0.08/kWh. The total gas usage is 76,837 therm/yr and the gas cost is \$53,610/yr. The average unit gas cost is \$0.70/therm.

Total utility spends (baseline) for the city to operate these facilities is \$194,857/yr. This is based on the time period from May 2019 to April 2020 and reflects a conservative utility analysis based on the lack of occupancy at Trinity and the Annex, as well as in March and April 2020 due to the COVID-19 pandemic.

### Project Summary:

CTS is providing following options for consideration. This master plan is developed based on University City's critical infrastructure needs, energy savings and CAPEX availability.

The recommendations below for a turnkey solution includes engineering, project management, architectural fees, permits / drawings, and work completion.

- ECM-1: LED Lighting & Lighting Control Upgrades
- ECM-2: Heating, Ventilating, Air Conditioning (HVAC) Upgrades
- ECM-3: Building Automation System
- FIM-1: Building Envelope Upgrades
- FIM-2: Interior Renovations

The ECMs listed above represent the preliminary improvement opportunities identified by CTS Group. Once selected as the preferred Qualified Provider, CTS will work with University City to customize an approach that will best address the priorities of the city and match available funding. Our team can also provide recommendations for a phased approach along with master planning efforts as the city's ongoing partner.

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## Existing Building and Infrastructure Conditions

### City Hall



## EXISTING CONDITIONS

### Building Data

<b>Gross Area (GSF):</b>	39,900
<b>Occupancy/Use:</b>	City Hall (Offices & Courthouse)
<b>Year of Construction:</b>	1903
<b>No. Levels:</b>	6

### Building

#### *General Construction*

The building was originally constructed in 1903 and houses the offices for city officials and courtrooms. The structure is comprised of precast concrete and terra cotta for all exterior areas of the building. The interior finishes consist primarily of plaster or gypsum board walls and decorative wood soffits. The ceiling is a hard ceiling with decorative trim and paintings featured throughout the central area of the building's first floor. The roof is a tin dome structure with a 16 year old TPA membrane at the top central section of the dome.

## Building Systems

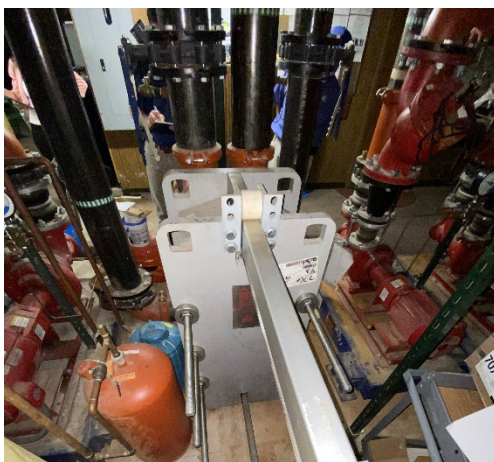
### *Mechanical*

Heating and cooling are accomplished with Water Source Heat Pumps (WSHPs) and Unit Ventilators (UVs).

The City Hall mostly receives heating and cooling through a Water Source Heat Pump loop, which serves floors one to four with (12) units. Each floor is served through three (3) ceiling-mounted heat pumps with low pressure ductwork that distributes air to the exterior circle of offices in the building. During the walkthrough, the heat pumps did not appear to have any fresh air ductwork to introduce outside air to the spaces. While fresh air can be brought into the building by opening windows, this does not always ensure the code required fresh air is being introduced and can create issues with indoor air quality. The heat pump loop is supplied through a cooling tower and boilers that maintain the loop temperature at a heat exchanger located in the basement. The WSHPs were installed about 15 years ago and are beginning to reach their recommended lifespan, according to the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE).



The fifth floor of the building serves as a courtroom and is served through (14) floor-mounted Unit Ventilators. The UVs are located along the outside octagonal walls of the building and provide both cooling and heating to the space. The units are controlled through onboard thermostats on each unit.



Heating hot water is provided through three (3) Lochinvar boiler units located in the basement mechanical space. The boilers were manufactured in 2016 and appear in great condition. Each boiler is equipped with a variable frequency drive (VFD) to control flow of the circulation loop.

Cooling chilled water is provided through a cooling tower located on the roof between the City Hall and Annex buildings. The tower is an Evapco unit manufactured in 2005 and it appears in fair condition. The ASHRAE recommended lifespan for a cooling tower is 20 years. CTS recommends the city begin planning for replacement of this unit within the next five years to avoid increased maintenance issues and expenditures.



A Bell and Gossett heat exchanger is used to maintain the water pump circulation loop temperature for the building. The unit was installed in 2005 and appears in good condition with no major maintenance issues.

### *Lighting*

Interior lighting at the City Hall is a mix of both T8 and LED fixtures. LED tube lighting is found primarily in offices and restrooms throughout the building. The center sections of the building appear to have decorative wall sconce fixtures serving them.

Exterior lighting is located on the second floor window sills around the outside walls of the building that serve as decorative up-lighting and have been fit with LED bulbs.

### *Temperature Controls*

The City Hall uses a Trane Building Automation System (BAS) to control and maintain the temperature for most of the building. The system did not appear to be a web-based BAS and must be controlled by designated computers located in the building. CTS recommends upgrading the system to be web-based to provide more capabilities for the maintenance staff.

### *Building Envelope*

Windows are single pane, wooden frame that appear older or original to the building. Windows are operable to allow for outside air to come into the building. Some windows were seen to have issues with sealing properly throughout the building and should be evaluated and/or upgraded by the city to ensure a quality building envelope.



Exterior doors are mostly aluminum frame store front style and appear in fair condition. The front entrance of the building still consists of the original wood doors and framing and are in poor condition due to prolonged wear. The city has discussed renovating the doors and maintaining the historic original appearance of the building's entrance.



Exterior finishes appear to be in fair to good condition with no significant cracks or damage to the concrete. Minor tuckpointing of the structure may be required for typical wear at joints in the structure.

The roof is a tin roofing system with a dome structure. The top of the dome also has a TPA (Tri-polymer Alloy) membrane roofing section that is 16 years old. The roof appears in fair condition. While no major issues were expressed by the facilities team, CTS did observe a small areas of water damage in the ceiling of the courtroom, indicating areas requiring repairs and patching to eliminate further water damage to interior finishes.

## City Hall Annex



## EXISTING CONDITIONS

### Building Data

<b>Gross Area (GSF):</b>	49,000
<b>Occupancy/Use:</b>	Police Station & Fire Department
<b>Year of Construction:</b>	1903
<b>No. Levels:</b>	3

### Building

#### *General Construction*

The Annex building was built in conjunction with the City Hall in 1903 and has previously housed the Police and Fire Departments. The building is mostly unoccupied currently, with the Police Department being moved to temporary portable units nearby the property for the past several years. The exterior finish is primarily pre-cast concrete, similar to the City Hall. The interior finishes consist of painted plaster and face brick walls and soffits throughout the building. The ceilings are a drop ceiling acoustic panel grid construction hanging over an older hard plaster ceiling. The roof is a built-up gravel flat roof construction.

## Building Systems

### Mechanical

Heating and cooling are accomplished with packaged Rooftop Units (RTUs), Split-System Furnaces, and Ductless Mini-Splits.



There are three (3) packaged RTUs that supply single-zone spaces through gas-fired heating and DX (Direct Expansion) cooling. The first unit is a 4-ton Carrier RTU manufactured in 2004 and this serves the Fire Department Bunk Hall. The second unit is a 5-ton Carrier RTU manufactured in 2007 which serves the Police Dispatch. The third unit is a 10-ton York RTU manufactured in 1993 which serves the 2<sup>nd</sup> Floor Detective Bureau and open area. All units are currently operating at or past their ASHRAE recommended lifespan of 15 years and should be considered for replacement to

decrease the risk of operational issues and costly repairs.

The rest of the building is served through five (5) split-system furnaces with steam coil heating and remote DX condenser cooling. The steam heating is provided through a distribution system coming from the steam boilers in the Trinity Building. The first unit is a 3-ton Carrier furnace manufactured in 2005, with a 2000 Carrier condensing unit, which serves the 3<sup>rd</sup> Floor. The second unit is a 3-ton Carrier furnace manufactured in 2005, with a 1996 Carrier condensing unit, which serves the Police Offices on the 2<sup>nd</sup> floor. The third unit is 3-ton Comfortmaker RPJ II furnace, with a 1994 Resco (Carrier) condensing unit, which



serves the 2<sup>nd</sup> Floor Offices. The fourth unit is a 10-ton Carrier furnace manufactured in 2006, with an 8.3-ton 2010 Carrier condensing unit, which serves the Basement and 1<sup>st</sup> Floor Breakroom. The fifth unit is a 12-ton Carrier furnace manufactured in 2006, with a 10-ton 2016 Guardian condensing unit, which serves the 1<sup>st</sup> Floor. CTS identified several condensing units that are operating past their ASHRAE recommended lifespan of 20 years and recommends these be replaced to avoid future maintenance issues. The age of the Comfortmaker furnace was not found on the unit, but due to its appearance and condition, it is also recommended to be replaced by the city.

There are also two (2) small Mitsubishi ductless mini-split systems manufactured in 2018 and 2019 that provide only cooling to the Server Room and 911 Call Dispatch Room. These units are newer and appear in good condition.

The Truck Bay for the Fire Department is provided heat through three (3) steam-fed space heaters supplied by the Trinity Building boilers. These units appear in good condition with no issues noted by the facilities team.

### *Lighting*

The interior lighting consists primarily of a mix of T-8 and T-12 fluorescent fixtures. Most fixtures are recessed troffer type throughout spaces with acoustic ceiling grid. There are no lighting controls for the interior lighting system.



### *Temperature Controls*



The temperature controls at the Annex consist of standalone thermostats for each furnace or RTU. There is no BAS to allow for zone temp control or setback scheduling when areas are unoccupied. CTS recommends the installation of a new Web-Based BAS to allow for better energy management and control over all areas of the building's heating and cooling.

### *Building Envelope*

Most windows were recently upgraded over the past several months in the building and are a double pane wooden frame construction.

Exterior doors are an aluminum door and frame construction and did not appear to have any significant wear or air seal leaks.

Exterior finishes appeared to be in good condition with minimal maintenance needed for typical cracks and wear.

The roof is a built up flat roof construction and appears to be in fair condition with no major issues expressed by the facilities team.



## Trinity Building



### EXISTING CONDITIONS

#### Building Data

Gross Area (GSF):	16,440
Occupancy/Use:	Currently Unoccupied (Previously Library)
Year of Construction:	1939
No. Levels:	3

#### Building

##### *General Construction*

The building was originally constructed in 1939 without any additions and previously housed the city's library. The exterior finish is a face brick and concrete construction. Interior finishes consist primarily of hard plaster walls and soffits. The ceiling construction also consists of hard plaster throughout most of the building. The roof is a sloped slate single roof construction.

### Building Systems

#### *Mechanical*

Heating and cooling are accomplished with steam radiators and window air conditioning units.

Steam radiators are used throughout the building to provide heating to exterior spaces and are connected to steam boilers located in the basement. Radiators are controlled through pneumatic controls connected to the radiator units. Cooling is provided through window air conditioning units. These units appear in fair to poor condition due to their age. The radiators and window units all appear well past their recommended lifespan and should be replaced for improved comfort and performance in the building.

The heating system is served through two (2) Trane steam boilers located in the basement of the building. The boilers were manufactured in 2010 and appear in good condition due to regular maintenance. The boilers also feed into steam piping that runs to the City Hall Annex to provide heating to several furnaces throughout the building. During an earlier walkthrough by CTS during the winter, the steam boilers were observed to be out of service due to frozen pipes upstream of the water inlet to the heating system.



#### *Lighting*

Lighting throughout the facility is almost entirely fluorescent fixtures and should be upgraded to LED retrofit tubes or new fixtures.

Exterior lighting fixtures are a mix of older decorative wall sconces that also could be upgraded.

**Temperature Controls** The building does not have a BAS system and temperature controls consist of only onboard sensors for the radiator and window AC units. There is no ability to control setback temperature scheduling or other automated control strategies. The city should consider installing a new Web-Based BAS to the building as it replaces the outdated HVAC equipment.



#### *Building Envelope*

Windows are single pane wooden frame and appear to be in poor condition with significant wear and seal issues due to their old age.

Exterior doors are aluminum frame and appear in fair condition with some wear due to their age.

Exterior masonry appears in fair condition and shows signs of significant wear and areas with cracking. Damaged areas should be tuckpointed to prevent further damage to the exterior structure.

The roof is two sections of a sloped slate shingle structure and flat built-up structure, and it appears in fair to poor condition. No major issues were expressed by the facilities team regarding the roof, but a previous roofing inspection from 2019 indicated that the slate shingle roofing areas were in poor condition and required immediate attention.





## Centennial Commons



### EXISTING CONDITIONS

#### Building Data

Gross Area (GSF):	16,440
Occupancy/Use:	Recreation & Exercise Facility
Year of Construction:	2005
No. Levels:	2

#### Building

##### *General Construction*

The building was originally constructed in 2005 and serves as a gym, pool, and recreation center for the city. The exterior finish is a mix of face brick, concrete masonry unit (CMU) block, and metal panel siding. Interior finishes consist of painted CMU and gypsum board walls and soffits. Ceilings in the main areas of the building are an open truss structure system, while smaller rooms have a hanging acoustic panel grid system. The roof is primarily a steel structure and flat rubber membrane construction.

## Building Systems

### *Mechanical*

Heating and cooling are accomplished with packaged Rooftop Units (RTUs) and Air Handling Units (AHUs).



The exercise areas and basketball gym are served through two (2) Trane packaged RTUs installed in 2005 with the original building. The unit uses gas-fired heating and DX cooling to serve the building through a variable air volume (VAV) system, using zoned VAV boxes with electric reheat to distribute air. The units are both at the end of their recommended ASHRAE lifespan of 15 years. During the audit, it was noticed by the team that one of the RTUs had its outside air intake bolted shut. This prevents fresh air from being mixed into the supply air system and can prevent the code required outside air from being brought into the building to maintain good indoor air quality.

Both RTUs are connected to the BAS controls.

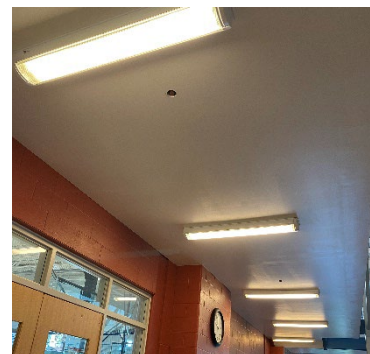
The soccer gym is served through three (3) Reznor packaged gas heating AHUs. The units are ceiling hung and located at each corner of the arena. The units only provide heating to the space, no cooling is provided to the arena. The units were installed in 2005 and are original to the building. Two of the units currently operate properly, the third unit has not run recently due to maintenance issues. Additionally, there was a fourth unit that previously served the space but has not worked for a longer time. CTS recommends replacing these units with appropriately sized new units that will provide enough heating to match the original configuration of the space.



### *Lighting*

The interior lighting of the building has been mostly converted to hanging LED strip fixtures. The basketball gym contains fluorescent T-5, 6-bulb high bay fixtures that replaced the older T-12 fixtures in 2012. The soccer arena has high bay LED fixtures installed in it. The smaller weight room still contains T-8 recessed troffer fixtures, and some miscellaneous surface fixtures near the entrance of the basketball courts are still T-8 or T-12 fixtures and should be upgraded. The interior lighting is normally controlled through a GE automation panel, but this system has not worked properly for several years.

Exterior lighting in the pool and baseball field areas are still high pressure sodium pole fixtures. These are manually shut off by the pool staff but



were previously on a similar GE automation system. Exterior lighting did not appear to have photocells installed.

### *Temperature Controls*

The building uses a Trane Tracer BAS system to control the HVAC systems and is original to the building. It is not a web-based system and must be controlled through designated computers in the facilities. It was communicated by the facilities team that no setback scheduling or demand control strategies are used to automate the system for increased energy management.



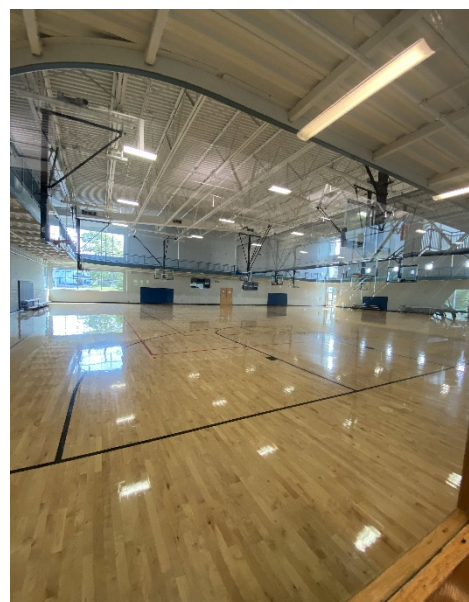
### *Building Envelope*

Windows are double pane, aluminum store front style and appear to be in good condition.

Exterior doors are aluminum frame that match the windows and are in good condition with no noticeable damage or air leaks.

Exterior masonry appears in good condition and no major issues were expressed by the facilities team. Minimal tuckpointing may be necessary for typical wear to the structure.

The roof is a flat rubber membrane system original to the building and appeared in good condition with no significant leaks present.



## Collaborative Approach for Building Renovations

CTS provides an alternative approach that incorporates the strengths of both Traditional Construction (“Design Bid Build”) and Performance Contracting. We all are familiar with Traditional Construction... but not everyone is familiar with Performance Contracting.

Our alternative approach improves collaboration between the owner, A&E consulting partners, and the contractors. We work together to develop, design, and implement solutions ranging from the renovation and preservation of existing structures, to the design and construction of entirely new facilities. The upside of this approach avoids the pitfalls of Traditional Construction and captures the benefits of Performance Contracting:

- Maximum Pricing with no change orders
- Ultimate accountability, single source responsibility of project performance
- Eliminate “Value Engineering” process common with traditional construction
- Ultimate control over selection of local trades
- Maximize capital funding sources by as much as 25 to 50%
- Projects can be completed 25 to 30% less time
- Decisions are made on lowering total cost of operation, not first cost alone

### ***Inherent Benefits of CTS approach***

Beyond the positive financial impact that the performance contracting model will provide, University City will also enjoy the following related benefits:

- *Equipment well beyond useful life expectancy will be replaced with highly efficient and reliable equipment.*
- *A Guarantee Maximum Price for the project with no Change Orders.*
- *The City will have input on the Design and local contractors to be involved with the project.*
- *By being good stewards of the taxpayer’s money as shown with the implementation of any of the recommended energy efficiency upgrades, University City will become a model for good environmental stewardship.*

## Energy Conservation Measures (ECMs)

### CTS Project Recommendations

The Energy Conservation Measures (ECMs) listed below represent all identified opportunities for building improvements across the audited city facilities. The intention of these preliminary ECMs is to assist with developing a master improvement plan from which the city can easily plan its future projects that will eliminate the most problematic equipment and avoid major maintenance issues with the facilities. Because city administrators are often working within annual budget constraints when planning construction projects, this master list allows the city to plan across an extended period of time to implement the building improvements in a phased approach that works within those constraints. If University City decides to work with CTS, the detailed audit phase of the project will allow for the team to further identify any opportunities and fine-tune the existing ones to maximize the value of a project with CTS.

### ECM-1: Lighting Upgrades and Lighting Controls

#### Lighting Technologies for Upgrades

CTS has completed a preliminary building survey of each of University City's facilities to obtain an accurate inventory of all fixture types, quantities, and conditions, while performing an analysis of how each existing lighting system is performing. This includes both interior and exterior lighting systems.

Several retrofits will be reviewed and analyzed during a detailed audit and the following solutions will be explored:

- The upgrade of any existing fluorescent lighting to LED technology.
- The upgrade of any existing HID or HPS lighting with more efficient LED light sources or fixtures.
- Analysis of the exterior lighting to determine what options are available for replacing or retrofitting the existing light fixtures with new LED light sources.
- Analysis of the implementation of lighting controls for occupancy control and dimming capabilities.

#### LED Upgrades

Quicker paybacks due to energy and operational savings coupled with more reasonable initial costs are allowing LED lighting and fixtures to become more popular in new installations and upgrades to older lighting technologies. There are different types of LED upgrades available for the traditional 2x4 fluorescent troffer that include retrofits of various types, as well as, full fixture replacements. Tube retrofits are classified as Type A, Type B, and Type C.

**Type A Tube Retrofit** – A Type A retrofit represents the simplest retrofit option, which is merely removing the existing fluorescent tube lights in a standard troffer and replacing them with tube LED bulbs that are compatible with the existing ballasts and lamp holders. If dimming or controllability of the fixture is a system requirement, the ballast will potentially limit those capabilities. Energy efficiency of the lighting system will be affected due to the power consumption of the ballast.



With a Type A retrofit, the ages of the existing electronic ballasts should also be considered. Ballasts that have been in service for 10 plus years are operating at the end of their typically anticipated service lives and will be more susceptible to failure. In these cases, it is advisable to replace the ballasts at the time of the lighting retrofit to provide a greater possibility for a trouble free, long term solution. Should the existing ballast life be less than 10 years, one can expect to replace them at some point during the life cycle of the LED tube, which should be accounted for in the lighting system's long-term operating costs.

**Type B Tube Retrofit** – A Type B retrofit represents the simplest total system with respect to the number of components involved. With this retrofit option, the LED tubes have an internal driver that operates the lamp versus utilizing the fixture's ballast as with a Type A retrofit, therefore, it is recommended that the fixture ballasts be removed and recycled. With a Type B retrofit, the line voltage wiring, previously feeding the ballast, is re-routed directly to the lamp holders. With this type of



fixture modification, the UL Listing of the fixture may be compromised unless a certified retrofit kit that is appropriate for the luminaire is utilized. For this reason, it is necessary to confirm that a Type B LED tube has a UL label affixed to it and the fixture should be identified as having been re-wired to alleviate any safety concerns in the future that are related to the installation of the wrong type of light source.

Type B LED tubes are not without their drawbacks as retrofits of this type may lack dimming and control capabilities and their operation may be susceptible to fluctuations in power as they do not require a ballast or remote driver that acts as a buffer.

**Type C Tube Retrofit** – A Type C retrofit also bypasses the existing ballasts, but the drivers utilized for the LED tubes are external, which allows low-voltage wiring to be utilized between the lamp holders and the driver, which will avoid the Type B line voltage issue. UL labeling of the fixture is required as with the Type B retrofits and a bit more labor may be required to accomplish the fixture rewiring.



There are some advantages to the Type C units that include the possibility of higher efficiency light sources along with longer life due to the drivers being able to be replaced instead of having to throw out the lamp as well. Being that LED drivers are not standardized; it is highly likely that a replacement driver will have to be purchased from the Type C lamp manufacturer. Also, with an external driver, the acceptance of

dimming controls may be feasible.

**Tube Retrofit Kits** – While LED Tube retrofits maintain the look of the existing troffer fixtures, which can be either good or bad, an LED retrofit kit may provide a completely updated look while improving on the performance of the fixture’s light distribution. Retrofit kits may vary in appearance and construction, but each will contain a driver, LED chips and an optical distribution system that will provide uniform light distribution, improved coverage, and minimal light loss in the work area. This enables our lighting designers to maximize application spacing and minimize the number of light fixtures required to illuminate each space safely and effectively. Retrofit Kits are available with built-in dimming drivers and most may include an occupancy sensor option.

**Retrofits for Incandescent and HID Fixtures** - Popular retrofits for socketed fixtures include a self-ballasted LED screw-in lamp, which can net a 78% reduction in energy consumption for a typical 60W incandescent application. There is an additional benefit of the LED retrofit, that is, an extended service life when compared to an incandescent light source; 25,000 hours compared to 1,000 hours. When comparing lifecycle costs, the low operational and maintenance costs of LED light sources make them very attractive compared to the incandescent lamp.

Another popular LED retrofit application is with street lighting and parking lot lighting. Many existing lighting fixtures in these applications utilize HID lamps such as high-pressure sodium (HPS) and metal halide (MH). Using LED lighting for streets and parking lots over HID lighting has many significant benefits. These include reduced energy usage and longevity, resulting in fewer lamp change-outs (saving high maintenance costs with tall light poles). LEDs also reduce risk from inadequately lit spaces when HID lamps are burned out (due to their shorter rated life) and areas become unsafe. LEDs also are flexible when it comes to controllability such as dimming or occupancy sensing, saving energy and helping comply with energy codes.

There are several items that CTS’s lighting designers will take into consideration when evaluating any LED retrofit application; the LED’s specifications will be reviewed to ensure that it will work in the specific application, the photometric information of the assembly, if it exists, will be analyzed to ensure that the final results will equal or exceed the original fixture’s performance, the luminaire system efficacy will be verified to determine if the uniformity of the light delivered by the retrofitted fixture will meet the

project's design criteria, and the color temperature and color rendering index of the LEDs will be analyzed for each application to ensure that it meets Maercker SD's needs.

**LED Replacement Fixtures** – CTS will conduct a thorough evaluation of the existing lighting conditions to determine if replacement fixtures are warranted. This analysis will include an evaluation of the condition of the old fixtures as it does not make economic sense to put a long-life, high cost lamp into aging infrastructure. The performance of the existing lighting system will also be measured based on light distribution, quality, and quantity. If everything is great, aside from the aged fixtures, CTS will match the results as much as possible, but there are often opportunities to improve things with different light fixture types or the arrangement of the fixtures. All scenarios will be analyzed.

CTS will seek approval for any new lighting fixtures by providing samples for aesthetic and performance evaluation and will provide mock-ups in rooms if further analysis is warranted.

#### *ECM-2.1 Lighting Upgrade – LED Upgrade and Occupancy Sensors*

CTS recommends the following scope of work to maximize both the latest efficiency gains and lighting control strategy to optimize energy savings.

All four buildings audited by CTS partially contain existing fluorescent fixtures that can be upgraded to new LED fixture or retrofitted with LED bulbs or tubes. CTS will work with the city to replace all remaining fluorescent lighting throughout all of the selected facilities. Common spaces that are typically occupied will be upgraded with new LED panel fixtures or decorative lighting based on existing fixtures. By matching the new fixtures to the existing LED panels, CTS will create a unified appearance throughout each building in addition to increasing energy efficiency.

Alongside the replacement of fluorescent fixtures, CTS will install new occupancy sensors and/or programmable dimmable switches in specified spaces. Doing so will increase the controllability of lighting for building staff and further cut down energy usage for spaces that are intermittently occupied and do not require constant lighting throughout the day and night.

#### *ECM-2.1 Lighting Upgrade – Lighting Automation Control System*

In addition to the replacement of all remaining fluorescent fixtures at Centennial Commons, the facilities team expressed a desire to replace the currently out of service lighting automation system with a new one to allow for remote control of the lighting throughout the building. CTS will replace the current system with a new automation system capable of web-based, remote control of all indoor and outdoor lighting systems at Centennial Commons.



## **ECM-2: HVAC Upgrades**

As a part of a detailed audit, CTS will fully evaluate the operation of the existing HVAC systems and equipment currently serving the City's facilities. The results of this evaluation will provide University City with a detailed plan to address any aging or malfunctioning equipment and comfort and operational complaints from building staff and occupants. A preliminary study of the HVAC system has been conducted by the CTS team to determine notable equipment requiring a replacement or upgrade. All equipment proposed for replacement is currently either operating past its recommended life expectancy or has been noted by the facilities team as having significant operational issues.

### **ECM-2.1 HVAC Upgrades – City Hall**

#### **Water Source Heat Pump Repair & Replacement**

The twelve (12) water source heat pumps (WSHP) that serve the first four floors of the building are all 15 years old and have begun reaching the end of their ASHRAE recommended lifespan. The units overall appear in fair condition, but some maintenance issues have been reported by the facilities team. CTS recommends that the city should plan and budget to replace remaining units within the next 2-5 years to reduce the expenses related to increased failures and repairs.

#### **Fan Coil Unit Replacement**

The fan coil units serving the fifth floor courtroom appear to be older and are assumed to be operating at or past their recommended lifespan of 15-20 years. CTS recommends replacing these units in the next 2-5 years alongside the heat pumps to reduce mechanical failure and increasing maintenance costs.

#### **Heat Exchanger Replacement**

The existing Bell & Gossett heat exchanger for the heat pump loop was manufactured in 2005. The ASHRAE recommended lifespan for this type of equipment is 15 years, so the existing heat exchanger is at the end of this recommended lifespan. CTS proposes to replace this unit with a new heat exchanger to reduce risk of mechanical failures and increased repair costs.

### **ECM-2.2 HVAC Upgrades – City Hall Annex**

#### **Rooftop Unit Replacement**

The Annex contains three (3) RTUs that serve various portions of the building. Of these units, two were identified as operating past their ASHRAE recommended lifespan of 15 years and appeared in fair to poor condition. The first unit is the 1993 York unit serving the 2<sup>nd</sup> floor detective bureau, which shows signs of

significant wear and rusting. The second unit is the 2004 Carrier unit serving the Fire Department bunk hall and it appears in fair condition but is now several years past its recommended lifespan. CTS recommends a one-for-one replacement of these units with similarly sized, high-efficiency rooftop units to reduce costs associated with maintenance issues on aging equipment.

### **Split System Furnace Replacement**

One (1) of the five split system furnaces in the Annex were identified as needing replacement. The 1994 Comfortmaker RPJ II furnace is currently operating past its ASHRAE recommended lifespan of 15-20 years. While no major issues with the unit were expressed by the facilities team, older equipment can lead to increased maintenance and performance issues—thus leading to increased repair costs. CTS recommends replacing the furnace with a new, similarly sized furnace unit to prevent these rising maintenance issues and costs.

### **Condensing Unit Replacement**

The split system furnaces all receive cooling supply through remote condensing units located either on the ground or roof of the Annex building. Of the condensing units seen, three (3) were identified as being in poor condition and/or operating past their recommended lifespan of 20 years. These are two (2) 2000 Carrier and one (1) 1994 Resco condensing units, which all showed signs of notable wear. CTS recommends replacing these units with similarly sized condensing units to maintain performance for the split system furnaces they serve.

### **ECM-2.3 HVAC Upgrades – Trinity Building**

#### **Steam Radiator & Window Unit Replacement**

Trinity is currently served heating and cooling through older steam radiators and window air conditioning units. These units appear significantly past their recommended service life and the city should replace all HVAC equipment in the building with a modern system to provide adequate comfort to all spaces. CTS will work with the city to determine a system that will fit the needs of the building to provide maximum comfort, while simultaneously managing energy usage and control. Possible solutions for replacement include new unit ventilators or rooftop units to serve the spaces.

### **ECM-2.4 HVAC Upgrades – Centennial Commons**

#### **Rooftop Unit Replacement**

The two RTUs serving the majority of the building are both original to the 2005 construction and are at the end of their ASHRAE recommended lifespan. The units both appear to be in poor to fair condition and show significant wear and rust. Additionally, the fresh air intake on one unit is completely shut and does

not provide the ventilation requirements needed by building code. CTS recommends replacing both older RTUs with new, high-efficiency packaged RTU models to meet all code requirements and increase system reliability. All new equipment would be reconnected to the existing BAS and commissioned to ensure proper operation.

### **Air Handling Heating Unit Replacement**

Of the original four (4) air handling units serving the soccer field, only two (2) are currently operating due to mechanical failures and maintenance issues. The units are all original to the 2005 construction. Due to their age and poor condition, CTS recommends replacing the Reznor heaters with new, high-efficiency AHU models to provide adequate heating to the space and decrease maintenance and operations costs.

### **ECM-2.5 HVAC Upgrades – Bipolar Ionization**

With increased awareness and concern for healthier building conditions in the wake of the COVID-19 pandemic, facilities managers have desired for methods of increasing Indoor Air Quality (IAQ) to prevent the spread of contagious diseases and viruses. An increasingly popular and affordable option to help improve the building's IAQ is through the installation of Needlepoint Bipolar Plasma Ionization (NBPI) systems on existing HVAC equipment.

NBPI systems work through producing both positive and negative ions that bind to Volatile Organic Compounds (VOCs), bacteria, mold, viruses (such as COVID-19), and dust. By doing so, the particles become heavier and prevent their ability to spread through the ductwork and airflow through the building. Needlepoint units are easily mounted into the air-handling equipment, typically being placed prior to the cooling coil. However, they can also be mounted into the unit or ductwork to work with a wide range of systems. The needlepoint units are also capable of being retrofitted into existing air-handling equipment, meaning IAQ can be improved even in buildings that do not require a full HVAC replacement. The units' low voltage power requirement allows them to be fed from the air-handling equipment's control panel. Overall, NBPI systems can significantly improve the air quality of a building and ensure the safest conditions for occupants by reducing the ability for bacteria and viruses to spread throughout the building.



CTS proposes to install new or retrofitted Needlepoint Bipolar Plasma Ionization systems in all air-handling systems across the city's facilities where they are desired. During the detailed audit phase, CTS will help the city to decide facilities that would benefit from the system and create an appropriate scope.

## ECM-3: Building Automation Controls

### Existing Systems

The existing controls systems at the audited buildings vary. Both City Hall and Centennial Commons currently have a Trane Tracer Building Automation System (BAS) to control the HVAC equipment. These were installed in 2005 and are standalone systems to each building that can only be accessed through designated computers in each building. The Annex utilizes standalone thermostats for each of the RTUs and furnaces throughout the building. These thermostats have minimal programming for temperature setpoint and do not allow for any advanced control strategies. Trinity does not have a BAS or thermostats and all HVAC equipment is controlled through onboard sensors and gauges on the radiators and window AC units. These provide the lowest level of control for the building's temperature.

### Proposed System

The existing buildings currently have a mix of different controls systems for their HVAC systems with various levels of control capabilities. CTS proposes to upgrade all buildings to be equipped with a Direct Digital Control (DDC) system. CTS will install a control system including all controllers and control components providing all engineering programming installation and start-up for the upgraded buildings. We evaluate a new control system or look to upgrade the current Trane systems.

It is our recommendation that the controls an integrated, web-based energy management controls system. The system will provide "Thin Client" computerized temperature control that is accessible from any computer that is connected to the Internet without the installation of any additional or proprietary software. The access shall allow multiple levels of access through hierarchy of passwords.

The system should be an open protocol system. It shall be capable of integrating to LonMark, BACnet, and Modbus Networks.

The system shall provide a full graphical interface. Custom graphics shall be provided and linked so that the entire town of Normal will be on a single home page. From the home page, the individual buildings will be accessible by selecting the desired building from a list of all connected facilities.

Time Schedules shall be graphical and have the ability to globally broadcast changes to the system. Schedules shall provide seven-day schedules with holiday periods and special events being capable of being entered throughout the year. It will also provide the capability to group equipment control from common global schedules.

The new DDC upgrade will provide more enhanced controls capabilities to include energy saving strategies like –

- Optimum Start/stop
- Demand control ventilation
- Night setback

- Heating & Cooling lockout based on OAT (Outside air Temperature)
- Morning warm-up with OA damper closed

Extensive owner training for maintenance, troubleshooting, and system operations shall be provided on site to all facilities staff regularly using this system.

### ***Additional Opportunities: Building Envelope & Interior Finishes***

In addition to traditional energy savings opportunities, CTS also identified several issues with the building envelope and interior finishes of the facilities. As part of a Guaranteed Energy Savings Contract, CTS is committed to providing the city with a wholistic plan for its facilities to allow for the best planning for future projects. The following building improvement opportunities can be used to develop a larger construction project for the city to remedy all issues at the selected facilities. CTS has extensive experience with managing and completing successful construction projects and can work with University City, if desired, to plan and/or execute the following opportunities.

#### **FIM-1: Building Envelope**

The building envelope includes roofing, exterior finishes, insulation, windows, and exterior doors. These components are important for any building to maintain proper operation and comfort for occupants inside. A poor building envelope can lead to water leaks that damage interior finishes and structures or poor air seals that allow conditioned air to escape and lead to comfort issues. Air leaks can also lead to HVAC equipment running longer to maintain normal temperatures, thus causing a higher energy expense. CTS has identified several opportunities for improving the existing building envelopes and decreasing issues associated with water and air leaks.

##### **FIM-1.1 Building Envelope – City Hall**

###### **Window Replacement**

The windows at the City Hall are single-pane, wood frame and appear to be original to the building's 1903 construction. CTS noted several windows that showed significant wear and others that did not appear to close and seal properly. All windows at the City Hall should be replaced with new, double-pane fixtures that will allow for better insulation and improve both the appearance and comfort of the building. Because of the City Hall's historic notability, CTS will work with the city to ensure windows are selected that will not compromise the current appearance of the building while providing adequate performance and reliability.

###### **Front Entrance Renovation**

The front entrance doors and framing of the City Hall are the original 1903 wood structure and are currently in poor condition. The exterior wood has been faded and damaged significantly from over 100 years of weathering from the outdoors. CTS will work with the city and any historical societies associated

with the city to replace the front entrance to the City Hall. Due to the historic significance of the building and especially the front entrance, CTS will ensure any renovation would maintain the historic appearance of the entrance while optimizing it for better resiliency and insulative performance.

### [FIM-1.2 Building Envelope – City Hall Annex](#)

#### **Roofing Inspection**

During the walkthrough, CTS noticed areas on the top floor of the Annex showing signs of water damage from roof leaks. As part of the detailed audit process, CTS will conduct an in-depth roofing inspection to identify problem areas and overall condition of the existing built-up roofing system. From this, a determination can be made on a possible partial or complete roofing replacement to remedy all leaks and areas with damaged insulation. By eliminating roofing leaks, moisture issues like mold growth will be reduced greatly and interior finishes will not also be damaged.

### [FIM-1.3 Building Envelope – Trinity](#)

#### **Window Replacement**

The windows at Trinity are original to the 1939 construction and are in poor condition due to their age. CTS will replace the single-pane, wooden window fixtures with new, double-pane windows to ensure a proper air seal and increased insulation.

#### **Roofing Inspection**

Currently, the condition of the roofing at Trinity ranges from fair to poor. During a detailed audit, CTS will do an analysis on the roofing structure to confirm the need for any spot repairs or replacements to the roofing sections. Doing so will prevent further damage and leaks that can lead to additional damage to interior finishes of the building.

#### **Tuckpointing**

The existing face brick structure of Trinity was noted by CTS as having cracks and damage to the masonry joints due to weathering and age of the building. To maintain proper structural integrity of the exterior walls, tuckpointing at areas showing cracks should be performed.

## **FIM-2: Interior Renovations**

Both the Trinity Building and City Hall Annex are currently unoccupied and mostly unused by University City. The Annex previously housed the fire and police departments, while Trinity served as the old library. During the walkthrough, it was noted by CTS that the interior finishes of the buildings appeared to have damage or significant wear due to leaks and moisture issues. With the building's future uses still being determined, the interior conditions of each building vary in quality and will need to be updated to provide

clean and quality spaces for future occupants. CTS can help plan and assist with renovating the interior finishes of both buildings to repair any damages to bring a fresh, new look for the future uses of the Annex and Trinity. This work would include any of the following:

- Space Planning and Design
- Ceiling Repair or Replacement
- Flooring Replacement
- Wall and Soffit Repair/
- Interior Door Replacement
- Painting

CTS has successfully worked with multiple clients in the past to plan and execute interior finish improvements that do not fall under the traditional scope of a Performance Contract. CTS proposes to work with the city to develop a scope of work for interior renovations across all desired buildings during the detailed audit phase of the project to meet the needs of the city in providing a quality environment for its multiple departments and staff.

### Energy and Utility Usage Analysis

Developing energy baseline & energy profile is the first critical step for any energy savings performance contract (ESPC) project. CTS has developed robust & proven process to create the energy baseline which is data driven and using actual field measurements.

Reviewing utility bills provides valuable information about the facility before doing any detailed analysis. The Energy User Index (EUI) is a helpful metric to begin understanding the amount of energy that a facility is using compared to buildings of similar category. The EUI provides a rate of energy usage based on the facility’s floor area and converts both gas and electric usage to kBtu/sq. ft. so a total energy usage can be calculated. From this EUI, CTS can compare the buildings in University City to similar facilities, regardless of their size. The U.S. Energy Information Administration provides a Commercial Buildings Energy Consumption Survey (CBECS) every six years that compiles building energy usage and provides average EUIs for different facility types. CTS uses this CBECS report to create a target energy usage for building improvements it implements.

The facility load factor (LF) can be calculated from the maximum demand (kW) and the total energy (kWh) consumed. A high load factor indicates that most of the equipment is operating constantly. A possible solution to reducing this load factor is developing an operational schedule for equipment based on occupancy rates and time of day within the building automation system that allows the equipment to run only when it is necessary. Doing so will help to decrease yearly energy usage, and consequently the energy bill, but also keeps equipment from having operational failures and lengthen its life expectancy. CTS will conduct in in-depth analysis on the energy usage and patterns at all city facilities to determine possible scheduling and energy savings.

The natural gas and electrical utility information for the 12 months of consumption at University City facilities with energy user index (EUI) and the cost/sq. ft. are listed below.

University City Facilities Assessment Summary			Utility Baseline Calculations												
Row Labels	Built (Year)	Floor Area (SF)	kwh/yr	Elec -\$/yr	Unit Costs \$/kWh	Elec (kBtu/ft2)	Gas Usage (therm/yr)	Gas Cost (\$/yr)	Unit Costs \$/therm	Gas (kBtu/ft2)	Total-\$	Total kBtu/ft2	kWh/ft2	therm/ft2	\$/ft2
1 University City Hall 6801 Delmar Blvd.	1903	39,900	315,520	\$ 28,105	\$ 0.089	27	21,832	\$ 12,721	\$ 0.58	55	\$ 40,826	82	7.91	0.55	\$ 1.02
4 Centennial Commons 7210 Olive Blvd.	2005	67,000	1,123,200	\$ 91,216	\$ 0.081	57	13,277	\$ 9,354	\$ 0.70	20	\$ 100,570	77	16.76	0.20	\$ 1.50
<b>Totals:</b>			<b>1,438,720</b>	<b>\$ 119,321</b>	<b>\$ 0.08</b>		<b>35,109</b>	<b>\$ 22,075</b>	<b>\$ 0.63</b>		<b>\$ 141,396</b>				<b>\$ 1.26</b>
			<b>% of Usage:</b>	<b>84%</b>			<b>% of Usage:</b>	<b>16%</b>							

*Note 1: A utility analysis was only performed on the City Hall and Centennial Commons. The utility information provided for Trinity Building was incomplete for the electrical usage. Additionally, the lack of occupancy at Trinity and the Annex during the analyzed period does not provide CTS with an accurate profile of the normal building usage from which a proper baseline can be calculated. This issue will affect the energy savings estimated and therefore was excluded as to not communicate an inaccurate savings estimate. During a detailed audit of the facilities CTS will be able to conduct a more thorough analysis of the facilities and provide the highest quality utility usage and savings information to the city.*



*Note 2: Due to the steam boilers at Trinity connecting to and supplying several heating units in the Annex, CTS estimated the amount of gas used by the steam boilers to heat this portion of the Annex. This was calculated based on the square footage of the Annex being served by units with steam heat coils. Gas usage and costs were allocated appropriately to reflect a more accurate EUI at the Annex.*

The total electricity usage at City Hall and Centennial Commons is 1,438,720 kWh/yr and the total electric costs are \$119,321/yr. Total gas usage is 35,109 therm/yr and the gas cost is \$22,075/yr. The average energy cost to operate these facilities is \$1.26/sq. ft. 72% of the energy budget is spent on electricity, while gas is 28% of the costs. These numbers calculated from the utility bills are used as a baseline for the energy usage from which CTS will improve upon.

The EUI for each building is shown above highlighted in yellow. City Hall had an EUI of 82, with a similar building type (Office) in CBECS having an EUI of 52. Centennial Commons had an EUI of 77, with a similar building type (Fitness Center) having an EUI of 51. Based on the utility analysis, both buildings are currently operating at a higher energy usage than most buildings of their respective types. CTS will work with the city to develop the best project for achieving energy savings and reaching or surpassing the benchmark EUI through Energy Conservation Measures (ECMs) that conform to the desires and needs of the city, while also working within the budget expressed by the administration.

## **Energy Savings Potential**

The energy savings calculated by CTS do not currently include potential savings at the Annex and Trinity. The presented energy savings are reflective of a conservative estimate based on the currently proposed energy savings measures (ECMs) and will be further refined as CTS works with the City to decide upon a well-defined scope of work.

It was estimated that the recommended improvements have a preliminary savings potential of 16% in annual energy savings resulting in roughly \$22,467/year in savings.

CTS will further evaluate the energy and operational savings during the detailed audit. Along with the utility bill analysis, a review of any existing BAS control strategies and operating parameters to determine guaranteed savings realized through the recommended improvements.

## Approach to Project

1. *Customer Engagement/Goal Setting*
2. *Heating & Cooling Load calculations*
3. *Lifecycle Analysis for various systems*
4. *Develop scope for preferred scope: HVAC system, Lighting, Solar, etc.*
5. *Develop Energy Savings Control strategies*
6. *Calculate baseline energy usage & costs including EUIs*
7. *Calculate estimated energy savings & potential utility incentives*
8. *Estimated Costs for preferred scope of work*
9. *Finalize Engineering*
10. *Finalize project costs through competitive process*

### **Life Cycle Infrastructure Program Management**

As the City is considering the replacement of various components of the existing HVAC system it is easy to decide to replace with a similar system or piece of equipment. While this solution most likely has the lowest first cost, is it the best strategy for the school considering the long term goals of the facility? As the entire system has aged past its useful life now is the time to consider the larger picture of replacement and long term life cycle impact.

In their base, lowest cost configuration, every HVAC equipment manufacturer's small tonnage rooftop units are in compliance with the latest energy codes and will meet most project specifications. What is not considered with this equipment specification are the additional operational costs, maintenance requirements and replacement costs of the equipment over the anticipated life of the facility. With these costs in mind, a comprehensive analysis needs to be put together to determine the best path forward for the District, not just for tomorrow but for years to come.

In order to gain an understanding of the long-term operational costs associated with different HVAC systems and to better quantify operational savings, CTS utilizes **Life Cycle Cost Analysis (LCCA)** evaluations during the development of any improvement for a guaranteed energy saving contract.

LCCA is an economic evaluation technique based upon the assumptions that multiple building design options can meet programmatic needs and achieve acceptable performance, and that these options have

differing initial, operating, and maintenance costs, and possibly different life cycles. For a given design, a LCCA can estimate the total cost of the resulting building or a specific building system or component, from initial construction through operation and maintenance, for some portion of the life of the building. By comparing the life cycle costs of various systems or even particular design components, a LCCA can assess trade-offs between low initial costs and long-term cost savings, identify the most cost-effective system for a given use, and determine how long it will take for a specific system to “pay back” its incremental cost.

### LCCA Evaluation

#### Capital Costs

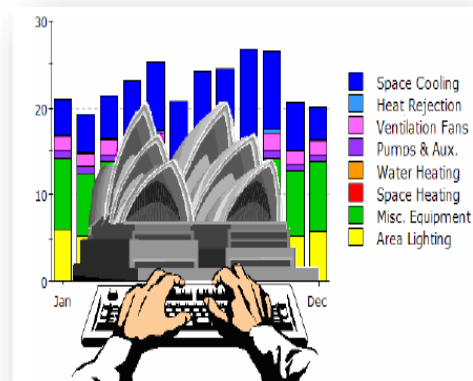
Once potential systems and components, in this case that pertain to Heating, Ventilating and Air-Conditioning (HVAC) systems, are identified and verified that they are in compliance with ANSI/ASHRAE 90.1-2007, Energy Standard for Buildings except Low-Rise Residential Buildings, the initial capital cost required for their installation must be determined. This is accomplished by developing scopes of work, design drawings and specifications to enable qualified contractors to effectively estimate costs for equipment, labor and materials required to install the systems at the focus facilities.

In addition to the construction costs for a project, the capital costs also include any required project support costs, such as fees, land acquisition costs, building fixtures, furnishings, and equipment, moving expenses, etc. Design, consulting, legal and other professional fees along with any construction-phase financing fees, if determined, are also included in the initial costs.

#### Utility Costs

Another component that is important to determine for each system option is the effect that the system has on energy consumption. This annual cost can be determined in several ways, the most popular being straight line calculations utilizing equivalent operating hours, heating/cooling loads, and unit costs of natural gas and electricity for the existing and proposed situations. The operating hours are TMY2-based BIN data for the combined hours of the building’s occupied and unoccupied periods.

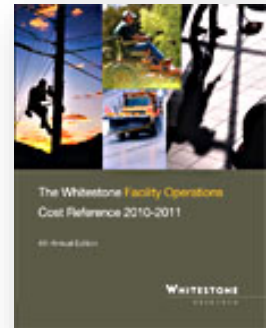
Another method available to determine the annual cost of utilities would be by simulating a system’s performance from energy modeling utilizing computer software such as eQuest, the US Department of Energy’s Energy Simulation computer software. In order to accomplish this, the mechanical equipment and system details for the proposed mechanical system alternatives would be entered into the program along with the anticipated building occupancy schedules, number of occupants in each space, assumed equipment loads and anticipated lighting loads. An energy simulation would then be performed by the software to estimate each individual system’s annual energy consumption.



### **Operational Costs**

The usual and customary recurring costs for operating the systems should also be identified and included in the LCCA. These costs are those that are associated with the ongoing maintenance, repair and replacement of components associated with the systems being compared. The differences in the present value of these costs over the system life cycle or valuation period are considered to be operational savings.

Operational costs, other than utility costs, fall into two areas, the first being ongoing maintenance activities, typically performed on an annual basis. Another area of operational costs that should be included in an LCCA are those costs associated with major repairs and replacements. CTS determined these operational costs by utilizing information found in a national database compiled by Whitestone Research and found in *The Whitestone Building Maintenance And Repair Cost Reference Manuals*.



### **Maintenance Costs**

Maintenance costs for each system are determined from typical preventive maintenance practices identified for the major system components. Using the Whitestone Research Database, CTS is able to extrapolate an annual dollar value for the time and material for those activities, and then determine a present value for these costs over the life cycle of the system.

### **Asset Repair/Renewal Costs**

Asset repair costs are identified at the year when typical major pieces of mechanical equipment require upgrades or improvements to continue to operate to its original design specification. Asset renewal costs include the costs of replacing the building components, systems and/or equipment that have an estimated life cycle that is less than what is planned for the facility. The predetermination of when a component, system or piece of equipment should be replaced is based on the historical physical life, technological life, and the economic life of the item. Engineering judgment should be applied to these service life assessments to consider owner operating and maintenance standards and the climate zone in which the facility resides.

CTS determines the asset life of the equipment based on from data found in the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) Standards, then adjusts them according to the Whitestone Research Database information when considering the climate zone and site conditions where the equipment is installed. These repair and renewal costs are then discounted to present value dollars for the purpose of the LCCA and to determine operational savings. Any salvage value assigned to the equipment that is removed was deducted from the renewal costs.



### **Quality of the Indoor Environment**

Though a cost cannot be attributed to the quality of the indoor environment, it is important to consider how the expenditures towards any building system and its operation affect the building spaces and occupants. The building, the energy consumed in the building and the skills of the facility managers that operate the building are all attributes required to provide comfort to the occupants of the facility. While one attribute cannot replace another, shortcomings in one area may be compensated by abundance of another. For example, the lack of energy can be compensated by an improved building or by skilled facility operators, but efficient energy use should never be achieved at the expense of occupant comfort or the quality of the environment.

The replacement or upgrading of a system may enhance occupant comfort and productivity, while providing improved energy utilization. This can translate into extensive savings on energy bills while maximizing occupant efficacy and/or overall comfort and well-being.

Realizing the importance of the quality of an indoor environment, all HVAC systems proposed by CTS are designed to maintain indoor air conditions (temperature and relative humidity) consistent with recommendations found in ANSI/ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, while maintaining ventilation requirements in compliance with ANSI/ASHRAE 62.2-2007, Ventilation for Acceptable Indoor Air Quality.

#### ***Life Cycle Cost Calculation***

After identifying all costs by year, amount, and discounting to present value, each is inputted into the equation,  $LCC = CI + (RC - SALV) + UC + MC + ADD$ , where:

- LCC = Total Life-Cycle Cost in present-value (PV) dollars,
- CI = PV of Initial Capital Investment,
- RC = PV Renewal Costs at the end of the typical asset life,
- SALV = PV Residual or resale/salvage value less disposal costs,
- UC = PV of Utility Costs,
- MC = PV of Maintenance Costs, and
- ADD = PV of Additional identifiable costs.

### Sample LCCA

Sample Elementary School HVAC Upgrade 30 Year Life Cycle Cost Analysis				Base Packaged Rooftop Units		Option A Water Source Heat Pump w/ Fluid Cooler and Boiler		Option B 2-Pipe Hot Water Chilled Water		Option C Ground Source Heat Pump w/ Vertical Well Field		
Study Title <b>Sample Elementary School HVAC Systems</b>				Projected Costs	Present Worth	Projected Costs	Present Worth	Projected Costs	Present Worth	Projected Costs	Present Worth	
Discount Rate : <b>5.0%</b>		Date: <b>5/30/2014</b>										
Life Cycle (Yrs.) <b>30</b>												
<b>Total Alteration/Replacement/Salvage Costs (Present Worth)</b>					\$716,400		\$564,573		\$402,059		\$479,555	
<b>Difference</b>							\$151,827		\$314,341		\$236,845	
<b>ANNUAL COSTS</b>	<b>Maintenance Costs</b>			Inflation/ Ecol. Rate	PW Factor							
	A.	Heat Pump Unit Yearly PM	4%	25.953		4,045	104,994			4,049	105,082	
	B.	Circulator Pump Yearly PM	4%	25.953		418	10,848			418	10,848	
	C.	Main Loop Pump Yearly PM	4%	25.953		45	1,168	90	2,336	45	1,168	
	D.	Fan Coil Unit Yearly PM	4%	25.953								
	E.	Outdoor Unit Yearly PM	4%	25.953								
	F.	Rooftop Unit Yearly PM	4%	25.953	8,843	229,495						
	G.	Unit Ventilator Yearly PM	4%	25.953				4,254	110,408			
	H.	Air-cooled Chiller Yearly PM	4%	25.953				725	18,829			
	I.	Fluid Cooler Yearly PM	4%	25.953			80	2,076				
	J.	Boiler Yearly PM	4%	25.953			554	14,378	797	20,691		
		<b>Subtotal Annual PM</b>			<b>8,843</b>	<b>229,495</b>	<b>5,142</b>	<b>133,464</b>	<b>5,867</b>	<b>152,264</b>	<b>4,512</b>	<b>117,099</b>
	<b>Utility Costs</b>											
		Building Electrical Consumption	5%	30.000		29,744	892,311	29,563	886,877	39,127	1,173,607	27,679
	Building Natural Gas Consumption	5%	30.000		5,246	157,374	3,525	105,762	8,179	245,369		
	<b>Subtotal Annual Utility Costs</b>			<b>34,990</b>	<b>1,049,685</b>	<b>33,088</b>	<b>992,639</b>	<b>47,306</b>	<b>1,419,176</b>	<b>27,679</b>	<b>830,360</b>	
<b>Total Annual Costs</b>					<b>\$43,832</b>	<b>\$1,279,180</b>	<b>\$38,230</b>	<b>\$1,126,103</b>	<b>\$53,173</b>	<b>\$1,571,439</b>	<b>\$32,191</b>	<b>\$947,458</b>
<b>LIFE CYCLE COSTS</b>	<b>Total Life Cycle Costs (Present Worth)</b>					\$1,995,580		\$1,880,729		\$2,209,192		\$1,837,910
	<b>Life Cycle Cost PW Difference</b>							\$114,851		(\$213,612)		\$157,669
	Payback - Simple Discounted (Added Cost / Annualized Savings)							9.6 Yrs.		N/A		
	- Fully Discounted (Added Cost+Interest / Annualized Savings)							13.4 Yrs.		N/A		
<b>Total Life Cycle Costs - Annualized</b>				Per Year:	\$129,815	Per Year:	\$122,344	Per Year:	\$143,711	Per Year:	\$119,559	

\*\* Repair, Replacement and Maintenance Costs were calculated based on information found in The Whitestone Building Maintenance and Repair Cost Reference 2010-2011 Manual.

## Funding Sources/Grant Opportunities

We appreciate that “turn-key solutions” not only represents the construction component of building renovations... securing adequate funding is essential and vital for municipalities as well. We have in-house resources that are familiar with various opportunities to secure grants/incentives and aware of low interest financing opportunities. Our project development team will develop an infrastructure renewal plan that is coupled with financial resources to minimize the impact to district funds and local tax payers.

Many times clients will leverage energy savings to offset renovation costs. When coupled with energy efficiency grants, on-going and long-term operating savings, clients are able to fund building wide renovations to improve the district buildings.

Recently, CTS has secured over 10 million in grant funding for local clients to help fund similar projects for their facilities.

The CTS recommendations are eligible for grants through the current Utility grant programs. As part of our partnership with University City, CTS will assist the City to pursue and secure grants that will help reduce the overall project payback period.

## Facility Surveys and Assessments

In evaluating the facilities throughout University City, we determined various strategies available to the city that will aid in lowering future capital investments and the operational and energy costs, all while improving the quality of the working environment for staff and community.

Specific recommendations which can assist University City in achieving their goal of reducing operational expenditures and preserving the existing facilities include upgrades to the existing HVAC systems, Lighting systems, and building automation systems.

There are various benefits which can be realized by University City from the implementation of a project based on a Life Cycle approach. These include, but are not limited to:

- Financial savings through decreased operating and energy expenses
- Optimization of the indoor environment for increased staff productivity
- Avoidance of risk associated with failure of older equipment
- Greater control and flexibility over the building systems
- Possible grant and rebate money available to reduce capital investment
- Increased reliability of mechanical systems
- Reduction of deferred maintenance
- Positive public relations
- Alignment with community wide energy and sustainability goals

A customized program for University City can only be achieved through a thorough evaluation of your current facility's conditions and operating processes. CTS refers to this approach as a comprehensive needs analysis. The needs analysis provides the information required for University City and CTS to develop a co-authored program that determines what to do, how to do it, how to maintain it, and how to fund it.

CTS ensures that the final solution will maximize the opportunity while minimizing your risk. This phase starts once you have selected CTS as your Performance Contracting partner. The detailed facility audit not only verifies preliminary analysis results, but it also uncovers other potential opportunities that may have been overlooked in the preliminary audit. CTS, our subcontractor partners, the district staff along with the maintenance staff and building occupants will work together to determine areas of concentration.

The next step in order to move forward with the detailed analysis is a Request for Qualifications or Proposals in order for University City to select a preferred qualified provider. This phase allows the district to receive proposals from qualified energy services companies. Once the proposals are reviewed, University City can also have interviews to determine the best fit for the city. The legislation allows for the city to select on best value rather than price, and the city can even have the request for proposal be qualification based.

### **Review of Guaranteed Energy Savings Contracts Process**

Pursuant to Missouri Statute 8.231 University City may enter into a contract for infrastructure improvement measures to reduce energy consumption and operating costs. This type of contract is known as a Guaranteed Energy Savings Contract or Performance-based Contract. As its name implies, Performance Contracting is a performance-based, turnkey approach to implementing facility improvement projects that generate savings from energy and operational costs.

Performance-based contracting eliminates a city's risk in two ways. First, CTS Group and other Qualified Providers establish the installation price for the entire project before the contract is signed. This provides the city the peace of mind that the project investment is known before proceeding with an agreement and there will not be any change orders after the bonds are sold. Second, CTS Group guarantees that the projected savings will occur.

The flow chart below outlines the Performancing Contracting process CTS follows, and a more detailed explanation of each stage follows.



### Step 1: Preliminary Infrastructure Analysis

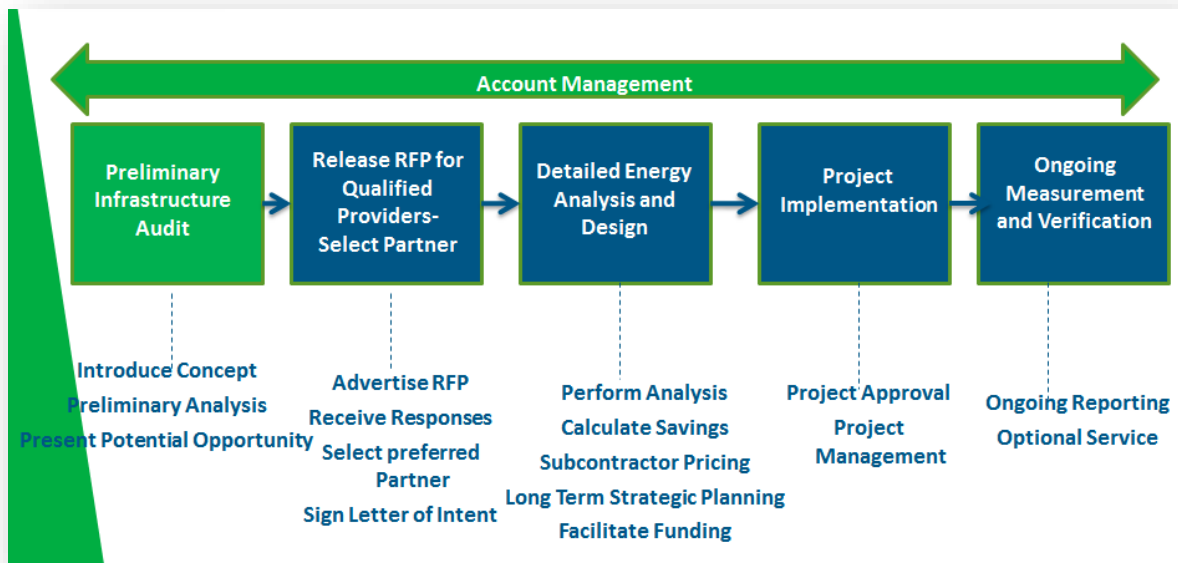
The Performance Contracting process begins with the preliminary investigation and analysis of the city's infrastructure with regards to its energy and water usage, its operational and maintenance budgets and its planned capital improvements. The purpose of the preliminary study is to determine the viability of utilizing performance-based contracting to address the city's concerns and to improve operating efficiencies. The results of this survey are documented in the initial report. Based on these preliminary findings, your decision to proceed will initiate the issuance for competitive proposals from Energy Service Companies (ESCOs).

### Step 2: Request for Qualifications and Letter of Intent

The city will work with the selected ESCO to identify a list of desired projects. With this direction, ESCO will commence with the detailed engineering assessment and design development of the preferred district-wide scope of work. Final construction contract will be presented to the city for consideration within 90 days. Design development services provided by CTS Group will be provided "at risk" and no expense prior to final contract approval by the district.

### Step 3: Detailed Analysis and Design– Customer Commitment

A detailed analysis of each facility improvement measure and overall building renovations is conducted to establish an accurate assessment of the projected budget revenue and expense impact. An individual



Business Case Analysis will then provide the city with the opportunity to select the best combination of improvements for your infrastructure. Water, wastewater, electricity operations, facility lighting, HVAC, controls and building envelopes can be investigated along with any other areas where our engineers feel

they can improve efficiencies. The cost of the Detailed Analysis phase typically costs nothing and any financial obligation can be confirmed prior to signing the Letter of Intent Agreement before you proceed.

#### ***Step 4: Contract Approval and Project Implementation***

After the Project Development Engineering is complete, the final agreement is generated and signed with a scope of the work, timeframes, savings calculations, cashflow, guarantee methods, and ongoing services if requested by the city. The ESCO will have a dedicated project manager assigned to the project. The installation will be done in a timely manner to realize expense avoidance as soon as possible.

#### ***Step 5: Measurement and Verification***

Since the ESCO is willing to financially guarantee the projects it undertakes, it is important for the ESCO to work closely with the city over the contract period. The ESCO will measure and verify the savings as part of the guarantee and provide a report one year after work is completed.

## Next Step

### **Next Step:**

We believe that the projected electric rate increases, and the aging infrastructure will elevate the need to explore the viability of Performance Contracting. We have identified an opportunity for University City to address building infrastructure, reduce operating costs and improve the quality of the working environment itself within each facility. The next step is to discuss and consider alternative funding sources and prioritize possible facility improvements along with project schedules.

### **Recommendation:**

Following a review of potential funding, project prioritization and timeline, we recommend that University City release a competitive Request For Proposal (RFQ) to competitively solicit proposals from companies to provide a guaranteed performance contract that could include the renovations for Police Station. The proposals will allow the city to weigh the advantage of a comprehensive infrastructure renewal plan that would drive energy efficiencies, explore/acquire state grants, and leverage existing funds to compliment the City's strategic facility plans. CTS can provide a sample Missouri RFP format that many cities have used to solicit proposals from interested Energy Service Companies. CTS would like to co-author a timeline with the City.