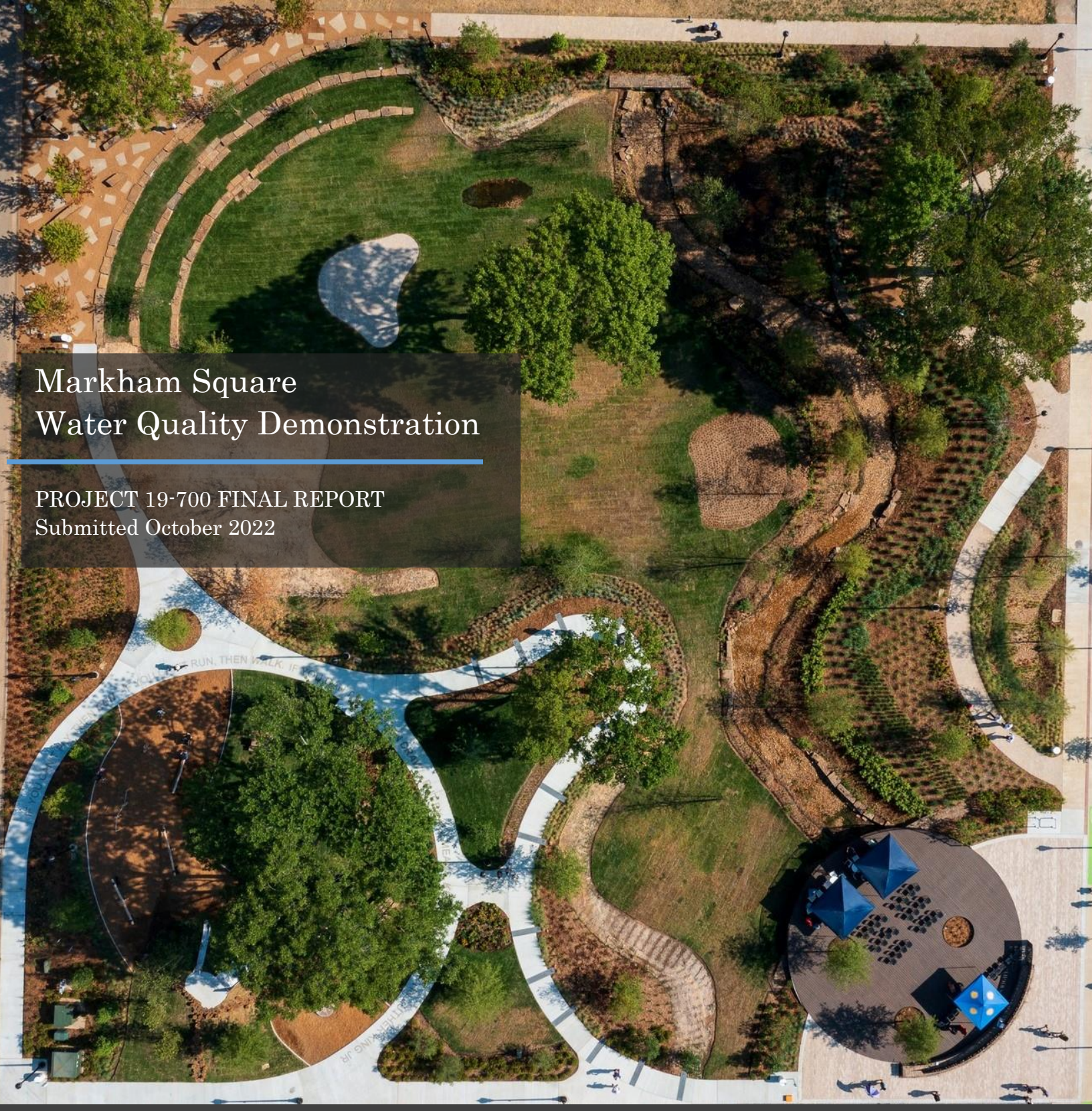
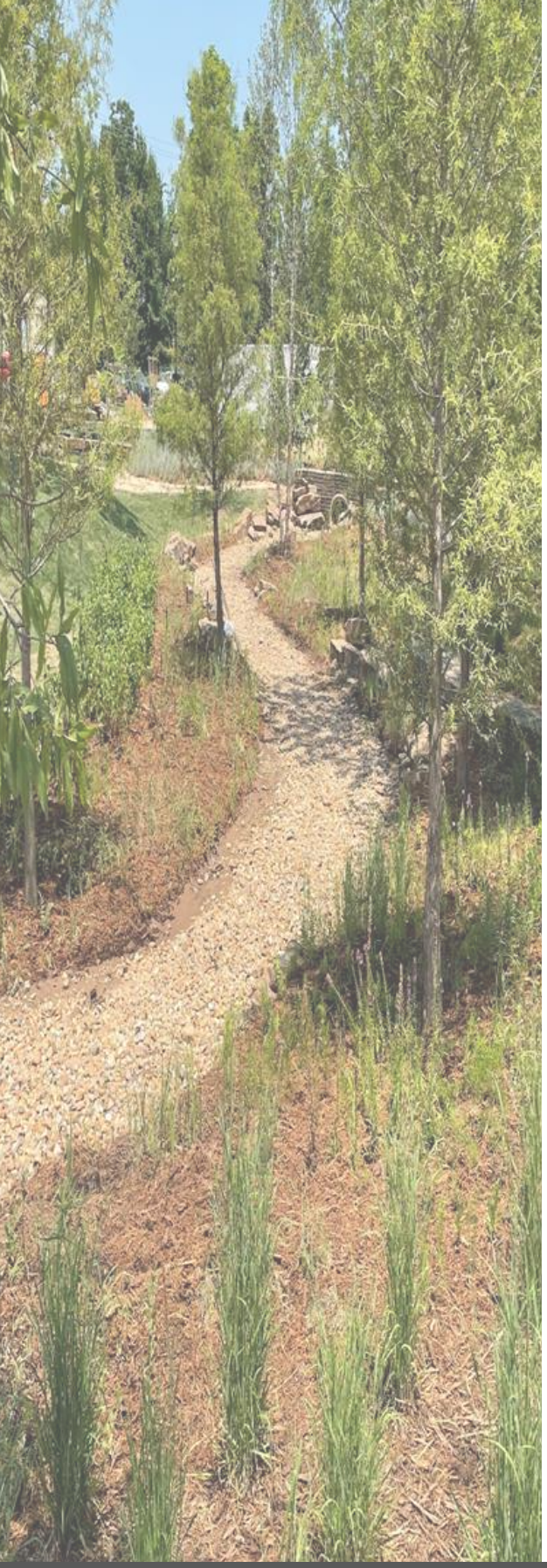


Markham Square
Water Quality Demonstration

PROJECT 19-700 FINAL REPORT
Submitted October 2022

City of Conway, Arkansas * 1111 Main Street * 72032 * www.conwayarkansas.gov



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EXECUTIVE SUMMARY

The vision of Markham Square (now formerly Martin Luther King Jr. Square) leverages site design to demonstrate a different future for stormwater management within the city of Conway, Arkansas. Through the development of this town square, a site that was plagued by flooding and contaminates was transformed into an environmental and cultural asset for the city. Green Infrastructure techniques, exuberant plantings, and social spaces encouraged the appreciation of natural ecological systems and will foster a culture of care and stewardship for the local landscapes.

This project took an environmentally deficient area of the city and transformed the project site into a major asset and showpiece for environmental justice. The city and partners designed soft engineering techniques to better manage stormwater runoff and utilize a treatment train sequence to increase water quality benefits. Using the power of plants and time will be a key ally in helping heal the natural surroundings and reduce flooding within the heart of downtown.

Implementing this project created a unique public space serving an underserved population of Conway helping heal the waters that enter the park but also heal a community that was historically treated inequitably.

PROJECT OBJECTIVES

The main objective of the MLK Square Water Quality Demonstration project was to transform a flood-prone, remediated, Brownfield site into a town square that integrated wetland-based stormwater treatment landscapes and demonstrate how Low Impact Development (LID) and Green Infrastructure (GI) techniques mitigate stormwater issues.

MLK Square aims to function as a stormwater detention and treatment demonstration but also functions as an urban, public space that serves the community in creating a better quality of life and educational opportunity to those who visit the town square. Education is a vital component of this project and was incorporated into the planning and design of the community space. Public involvement, educational videos, press releases, informational signage, and surveys were included into the project objectives.

There were five overall tasks for this project that included: Financial Review, Design and Engineering, Infrastructure Construction, Education and Public Involvement, and Reporting. The City had three years of financial reviews performed by an independent accounting firm. The design and engineering aspects of the project was completed in coordination with SWA Group and the University of Arkansas Community Design Center. The integration of the infrastructure was subcontracted to Crow Group and monitored by city staff. The city held several public outreach meetings that involved the public in key aspects of the project and design elements. Informational signage and videos were produced with assistance from project partners in helping educate the community on the environmental aspects of the park. Press releases and social media posts were utilized in generating interest and relaying information about the project to the public. A post-construction survey and questionnaire was published on September 13, 2022 and received valuable responses from the community on the knowledge gained from this project (Appendix D). All reporting requirements were completed and submitted to Natural Resources Division in a timely manner to keep them aware of project progress.

PROJECT GOALS

Creating a public space that could treat stormwater runoff and, in the process, increase water quality was the primary focus for this project. Measures of success consisted of creating a treatment train for entering stormwater, enhancing public use of the project area, increasing the general knowledge of green infrastructure and low-impact development practices, and creating educational videos that were disseminated to the public.

Along with creating this stormwater treatment park and demonstration site, there were other goals identified and incorporated into MLK Square. Addressing downtown flooding issues, honoring community leaders and Martin Luther King Jr., promoting equity, integrating art, boosting economic competitiveness, and improving the overall community quality of life were all goals with the development of this project.

PROJECT LOCATION

MLK Square is situated in the city of Conway, AR just north of the downtown area and south of the Hendrix College footprint. It is on the western side of Markham Street and between Garland and Willow Street with Spencer Street on the western border of the park.

This project is in the eastern portion the Lake Conway-Point Remove Watershed (HUC#11110203) and within the Little-Palarm Creek Subwatershed (HUC#111102030403).

PROJECT BUDGET

Overall Project Costs

Total Project Costs	$1,480,548.00
Total Federal Costs	$599,995.00
Total Non-Federal Costs	$880,553

Primary Implementation Costs

Informational Signage	$4,500.00
Design and Engineering	$169,621.00
Construction (Federal)	$599,995.00
Construction (Non-Federal)	$700,432.00

Quarterly Payments and Match

Quarter	Federal Cost	Match Generated
OND 2019	$11,000.00	$18,000.00
JFM 2020	$11,000.00	$45,000.00
AMJ 2020	$11,000.00	$0.00
JAS 2020	$11,000.00	$165,000.00
OND 2020	$11,000.00	$95,000.00
JFM 2021	$16,000.00	$25,000.00
AMJ 2021	$29,000.00	$90,000.00
JAS 2021	$116,000.00	$50,000.00
OND 2021	$161,000.00	$65,000.00
JFM 2022	$61,000.00	$120,000.00
AMJ 2022	$61,000.00	$50,000.00
JAS 2022	$41,000.00	$147,553.00
Final	$59,995.00	$10,000.00

WATER QUALITY DESIGN ELEMENTS

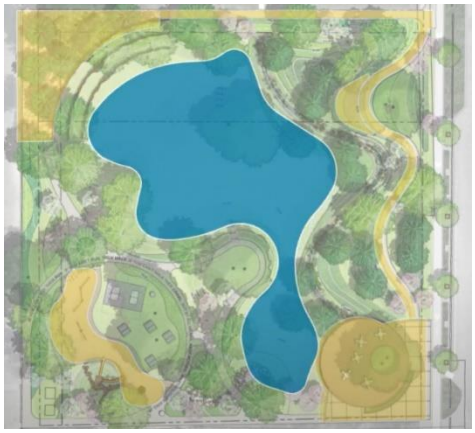
MLK Square has integrated soft engineering design elements to better manage stormwater runoff and create a treatment train that will slow the stormwater, allow for absorption and evaporation, capture and breakdown pollutants, and release higher quality water from the demonstration site.

There have been five primary design elements integrated into the square:

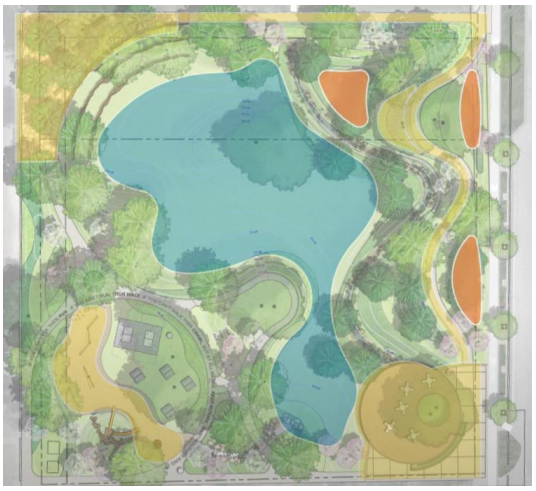
1. Permeable Paving
2. Infiltration Basin
3. Rain Gardens
4. Bioswales
5. Vegetated Walls

Permeable Paving (depicted in yellow) utilizes small openings in joints or material makeup that allows water to pass through hardscapes and infiltrate the ground, while removing sediment and trapping pollutants along the way.

Infiltration Basins (depicted in blue) are large, shallow areas with permeable soils that temporarily detain and infiltrate stormwater. These vegetated depressions are designed to store runoff and allow for absorption. Typically, these areas will be dry except during heavy rainfall events.



Rain Gardens (depicted in orange) are depressions that are vegetated and designed to treat water as it passes through roots and soils during infiltration into the ground. Rain Gardens can consist of shrubs, perennials, flowers, and grasses and will temporarily detain and treat stormwater.



Bioswales (depicted in blue) are planted depressions that are designed to treat water through phytoremediation as it is conveyed in a downstream manner. Stormwater is treated as it meanders through the bioswale.

Vegetated Walls (depicted in green) utilize vertical water harvesting to treat water and reduce stormwater runoff loads.

INFRASTRUCTURE IMPLEMENTATION

Green Infrastructure and Low Impact Development practices funded by the Environmental Protection Agency and Arkansas Natural Resources Division consisted of porous pavers, permeable hardscapes, vegetated walls, raingardens, infiltration basin, and a bioswale. These practices were installed in the project site during the timeframe of June 2021 – July 2022.

City staff went through the process of preparing bid documents, advertising a request for bids, and opening bids on April 21, 2021. Out of that process, Crow Group, Inc. was selected to be the construction contractor.

A pre-construction conference was held on May 26, 2021, with the construction contractor and a notice to proceed was issued on June 14, 2021. All applicable permits were obtained with construction commencing. Throughout the construction of the project city engineers performed inspections and summarized observations. There were change orders and discussions had with Crow Group throughout the process of construction and it was a collaborative partnership. Regular meetings were held with the construction contractor to update city staff on the progress of construction.

Project Infrastructure Implementation concluded in early July 2022 and a groundbreaking ceremony was held on July 14th.

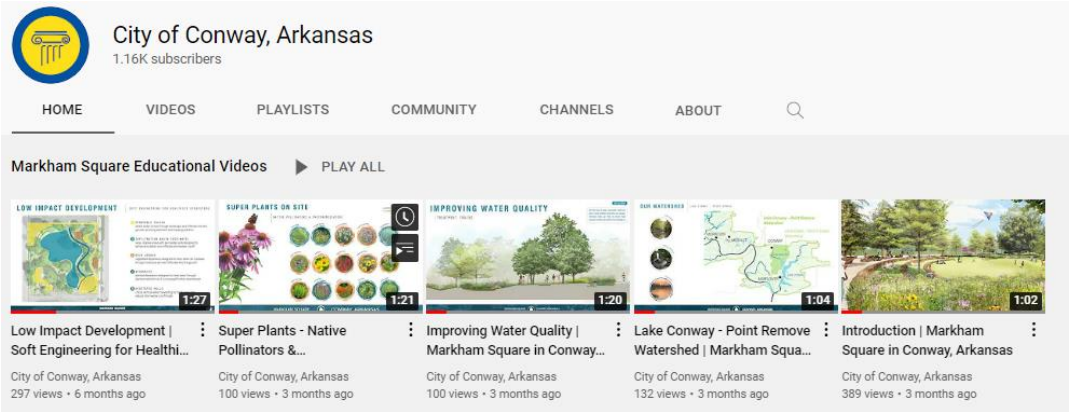
Appendix A and B contain pictures from construction efforts showing LID/GI practice types and construction progress over the project timeframe.

PUBLIC INVOLVEMENT AND EDUCATION

Considerable efforts were made with this project to include the public into the design process and educate the community and visitors on the environmental services that MLK Square provides.

At the start of the project, an in-person workshop and virtual meetings were held to solicit and incorporate public input on pre-design, preliminary design, and final design of the town square. These meetings helped city staff and the engineering contractor refine programmatic needs for the design process. A virtual meeting was also held with the Lake Conway Point Remove Watershed Alliance (LCPRWA). There were also two events held that were open to the public and advertised through press and social media outlets. These events were the groundbreaking and ribbon cutting ceremony that were held a little more than one year apart.

This project provided informative graphics, press releases, social media posts, educational videos, and educational signage to inform the public about the process of developing the site and educate them about the water quality aspects that were integrated into MLK Square.



HISTORIC AND COMMUNITY CONTEXT

One of the historically worst environmental areas of the city has been transformed into a major asset and community showpiece that promotes environmental justice and honors the past. The Markham Street and Pine Street Community historically was not treated equitably, and this area of Conway was deserving of this amenity and functional park.

Markham Street was heart of the Black business district for Conway, featuring businesses such as the Deluxe Diner and Mattison's Blacksmith shop. The revitalization of this corridor was initiated in 2013 through the funding of a study to rethink this area of the community. This planning study began the process of catalyzing development and focusing investments. Within that plan, a key consideration was to include a public space that would also address environmental issues.

MLK Square became more than just a water quality project. It transformed into a gathering place where the community could reflect the identity and culture of the park's surroundings. MLK Square highlights and pays tribute to the historic contributions of the African American community who made an impact on the local, state, and national level and creates environmental and social healing within the community.

CHALLENGES AND LESSONS LEARNED

The challenges associated with this project all pertained to the environment, people, and supplies.

Weather and location were big environmental factors in implementing the project in a timely manner. Navigating weather issues are expected when putting in a project such as this one. There were weather delays during the construction phase of the project that negatively affected the project timeline. Overall, MLK Square was implemented within the boundaries of the workplan timeline, but City staff was hopeful to have the construction phase completed before those expected deadlines. The location of the project played a factor in the construction phase due to being in an urban setting and managing large equipment delivery in and out of the project site. There were not big delays due to the project location, but it was something that city staff and contractors had to consider.

The challenges that were people-related pertained to work coordination and communication. Our project partners for this endeavor were great and there were no major problems with the implementation of this project. There are always opportunities for improved communication and coordination.

Finally, a challenge that arose during the construction phase of the project dealt with products and materials. Due to the COVID-19 Pandemic and supply chain issues, there were delays experienced with certain needed products and supplies, such as vegetation materials. The city and contractor navigated this challenge and worked through the delays in a timely manner.

Overall, the challenges that arose during this project were minimal during the project period. There were lessons learned throughout the process and valuable experience gained. The city of Conway will utilize these lessons learned for projects that will be implemented in the future.

CONCLUSIONS

The Martin Luther King Jr. Square (MLK Square) Water Quality Demonstration project sought to demonstrate how Low Impact Development and Green Infrastructure techniques could be used in an urban setting to mitigate and treat stormwater. With the implementation of these techniques and practices, this project is delivering environmentally responsible and ecosystem services. This project provides air quality regulation, water regulation and infiltration, erosion control, nutrient cycling, waste treatment, and recreation as ecosystem services.

In addition to the ecosystem services that MLK Square provides, there are other benefits that aid in reducing nonpoint source pollution within the Lake-Conway Point Remove Watershed. The educational benefits this project provides will make a big difference in the Conway community and surrounding communities who view this project as a beneficial demonstration. Overall, the public has had positive responses to the project and gained knowledge from their visit to the square (Appendix D). Urban settings need as much green infrastructure as possible, and this project is an important step educating the community on the benefits of GI and LID practices. Along with increasing knowledge and adoption of the demonstrated practices, the community will have an increase in quality of life with the integration of this public park. Residents and visitors will be able to utilize this public space for recreation and relaxation as they appreciate the natural ambiance within the rapidly growing city of Conway.

The four measures of success for this project listed in the project proposal were treating stormwater entering the site through a treatment train process, enhancing the public's use of the square, producing five one-minute videos that were disseminated to the public, and increasing the public's general knowledge and understanding of GI and LID practices. These measures of success were all met and will continue to be met for the life of the implemented project. Early estimates using the Pollutant Load Estimation Tool (PLET) predicted nitrogen being reduced by 41%, phosphorus by 44%, and sediment loads by 47% with the implemented LID practices.

The city had many valuable partners and community stakeholders who helped this project become a success. This project also would have not been a success without the financial support from the Environmental Protection Agency and Arkansas Natural Resources Division.

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Appendix A Construction Progress Pictures

Pre-Construction Photos (2018)

Appendix A Construction Progress Pictures

Overhead View of Markham Square on July 8, 2021

Appendix A Construction Progress Pictures

Overhead Corner View on July 8, 2021

Appendix A Construction Progress Pictures

Overhead View on October 21, 2021

Appendix A Construction Progress Pictures

Overhead Corner View on October 21, 2021

Appendix A Construction Progress Pictures

Overhead View on December 3, 2021

Appendix A Construction Progress Pictures

Overhead View on March 3, 2022

Appendix A Construction Progress Pictures

Overhead Corner View on March 3, 2022

Appendix A Construction Progress Pictures

Overhead View on June 1, 2022

Appendix A Construction Progress Pictures

Overhead Corner View on June 1, 2022

Appendix A Construction Progress Pictures

Overhead View on July 14, 2022

Appendix A Construction Progress Pictures

Overhead Corner View on July 14, 2022

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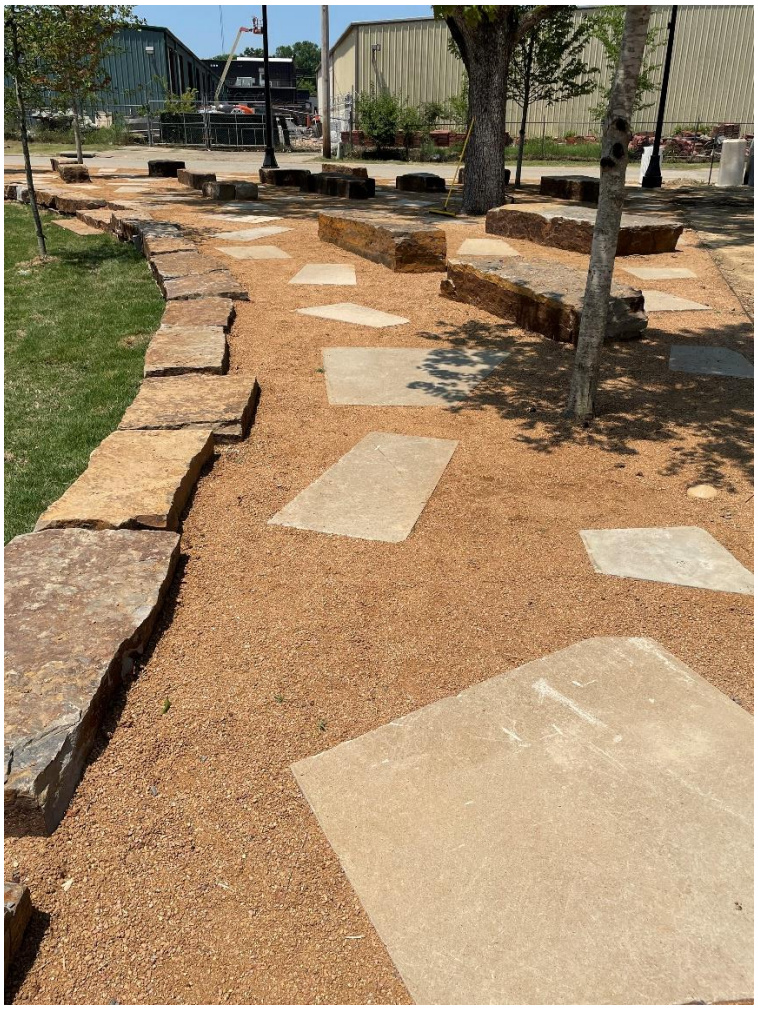
Appendix B Green Infrastructure and Low Impact Development Practice Pictures

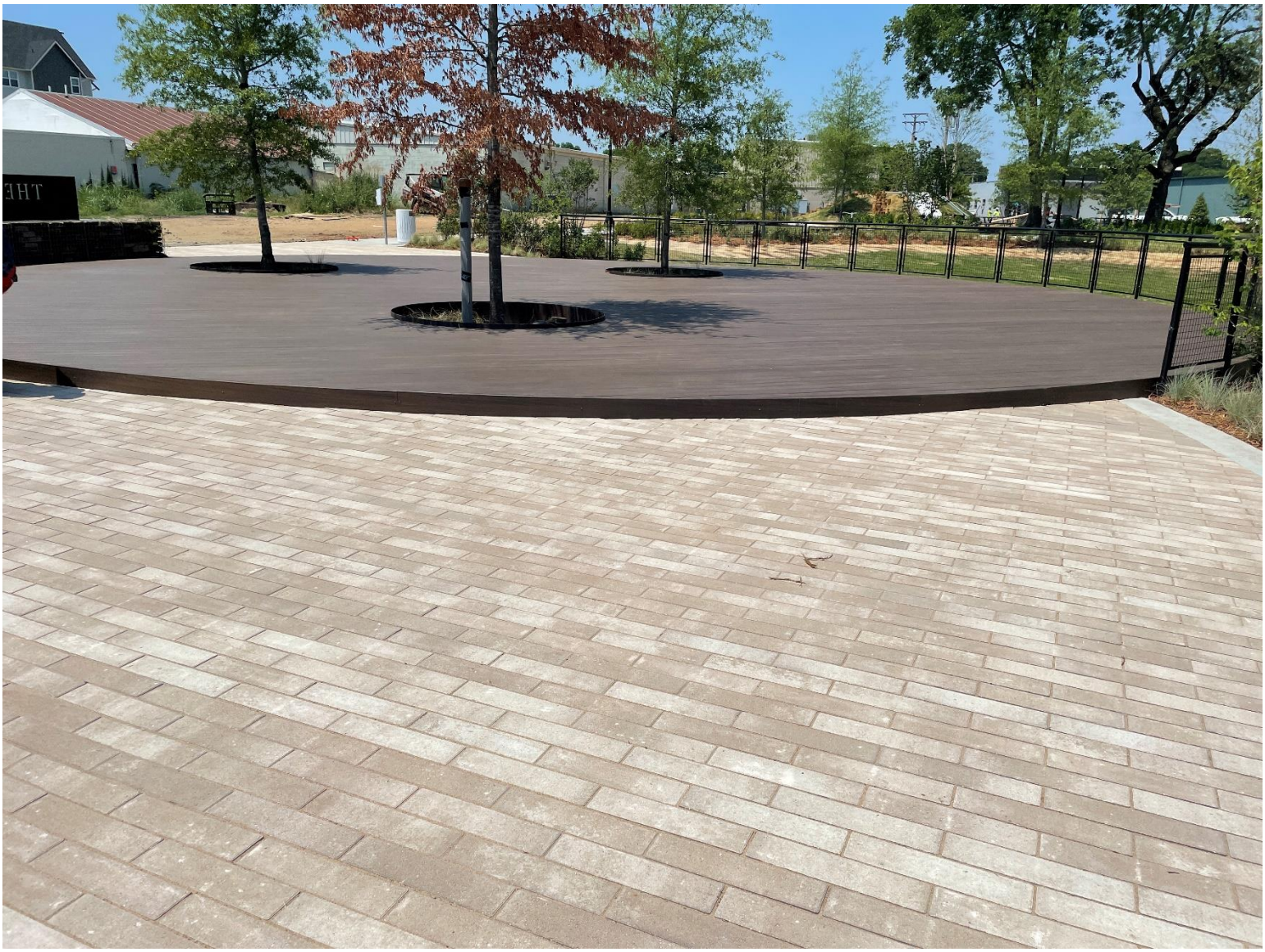
Rain Garden

Appendix B Green Infrastructure and Low Impact Development Practice Pictures



Porous Paving

Appendix B Green Infrastructure and Low Impact Development Practice Pictures



Porous Pavers and Decking

Appendix B Green Infrastructure and Low Impact Development Practice Pictures

Porous Playground Area

Appendix B Green Infrastructure and Low Impact Development Practice Pictures

Bioswale (looking North)

Appendix B Green Infrastructure and Low Impact Development Practice Pictures

Bioswale (looking South)

Appendix B Green Infrastructure and Low Impact Development Practice Pictures

Infiltration Basin (looking South)

Appendix B Green Infrastructure and Low Impact Development Practice Pictures

Infiltration Basin (looking North)

Appendix B Green Infrastructure and Low Impact Development Practice Pictures

Vegetated Walls

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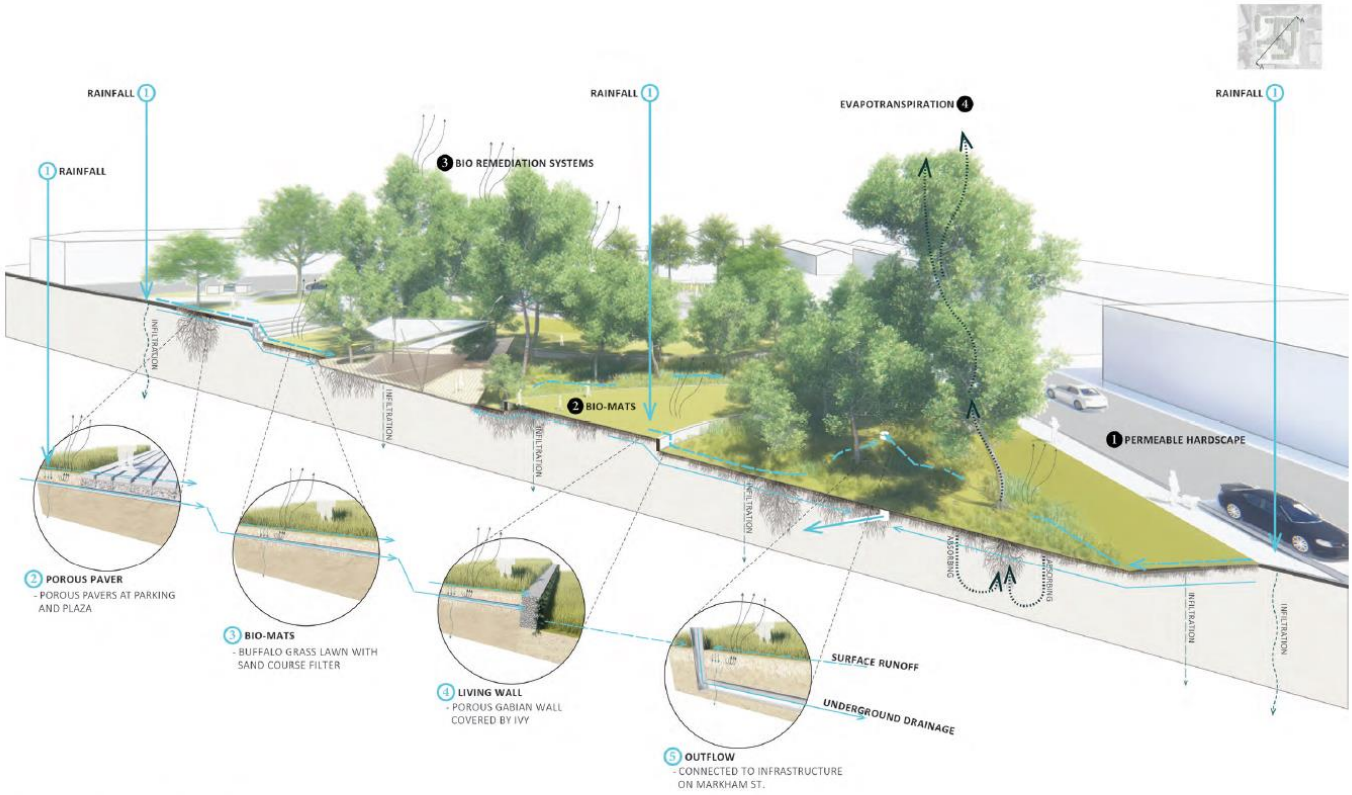
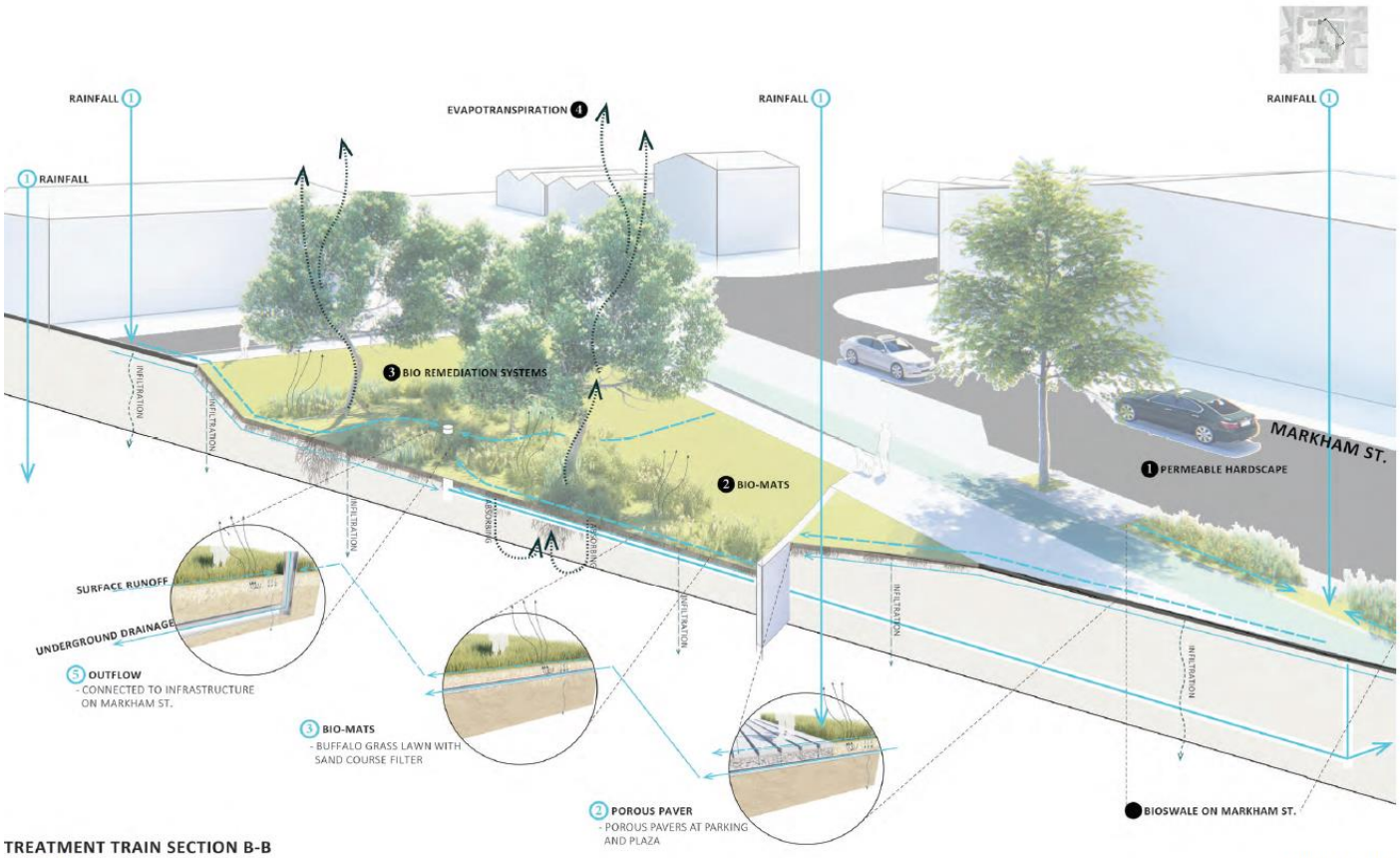
Appendix C Treatment Trains



TREATMENT TRAIN SECTION A-A

EDG

MARKHAM SQUARE



TREATMENT TRAIN SECTION B-B

EDG

MARKHAM SQUARE

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Appendix D MLK Square Questionnaire Report

Martin Luther King Jr Square Questionnaire Results
City of Conway, Arkansas

A brief questionnaire was hosted on the City of Conway's website from Monday, September 12 through Friday, September 23. The questionnaire was completed by 135 people.

- https://conwayarkansas.gov/mayor/martin-luther-king-jr-square-questionnaire/

Four questions were asked regarding low impact development techniques in MLK Jr Square. A summary of the results can be found on this page. One paragraph box was added to solicit open ended feedback. The results can be found in subsequent pages of this report.

1. Have you visited MLK Square after a rain event to witness low impact development (LID) techniques in action?
    - 23.70% – 32 – Yes
    - 37.04% – 50 – No
    - 39.26% – 53 – I plan to visit in the future
2. Should the City of Conway consider incorporating low impact development (LID) techniques into future projects?
    - 72.59% – 98 – Yes
    - 06.67% – 09 – No
    - 20.74% – 28 – Unsure / Don't Know
3. How likely are you to incorporate low impact development techniques into your next project?
    - 35.56% – 48 – Likely
    - 12.59% – 17 – Neither Likely nor Unlikely
    - 12.59% – 17 – Unlikely
    - 39.26% – 53 – Unsure / Don't Know
4. After visiting Martin Luther King Jr Square, are likely are you to plant native plants in your landscape?
    - 62.96% – 85 – Likely
    - 11.11% – 15 – Neither Likely nor Unlikely
    - 10.37% – 14 – Unlikely
    - 15.56% – 21 – Unsure / Don't Know

FEEDBACK
Please continue planting native plants in Conway city parks and other city properties, and please don't use pesticides—they kill beneficial insects as well as "bad" ones!
Wonderful asset to the city! Thank you!
Would be great to get a grant or other funding that could provide native plants to city homeowners. Or help people incorporate natural run off water solutions.
The memorial looks so cheap. Really? Rusted out iron? And the LID really does nothing worthwhile or beneficial.
We absolutely love the new park and can't wait to see what you do next!
Ants are weird
I wish low impact designs were mandatory in all Conway developments! It breaks my heart to see real estate developers using "strip mining" techniques. For example, the two housing developments on South German, south of Dave Ward Rd. It's heartbreaking to see large wooded areas bulldozed down to the dirt. Surely we are smart enough to prevent developers from destroying our native, woodsy quality in Conway.
I applaud the use of native plants. I have been incorporating them into my home landscaping for several years and hope others will be inspired to do so.
I love the park and walk there frequently. I love learning the history of Conway while being there. The design is beautiful and I have gotten a lot of ideas for my own yard from the plants.
Loved the park!
Encouraging planting native plants in both the private, business and city sector is paramount. In turn, working with code enforcement/city policies follows suite in order to maintain healthy and robust native plant areas in these sectors. Understanding seed dispersal times, high pollinator activity etc. is crucial to have a sustainable impact and must be addressed in current and future city policies.
Please share more about the square so that the public doesn't forget it's there. Maybe extend toad suck down to that location so people can relax and enjoy their concessions. Have a helper in place to spare littering in the park during events. After the community becomes aware that these, as well as other parks, then they utilize them more properly—as well as pay them the respect they are due.
Haven't visited it yet....too hot!
Beautiful area even when it's dry. The mass of plantings are impressive.
What a great project and I already started planting native plants in my area. Thank you for this.

The playground stuff is getting ruined from not so good work. Looks like they either didn't pre drill the holes in the logs or the wood is not good quality. Many things are splitting. Having some shade for parents would be nice.

I'm always interested in innovative practices, but finding contractors to do them is more difficult. I don't know if there's a role for the city in that, but I do know I'd like to be able to find people who are familiar with things like this.

Looks awful

Love the new park!!!

The park is fantastic! I love to see the native plants. Thank you for putting in so much care and hard work into the project. Our town is beautiful and our local nature is also beautiful. Would love to see more projects like this around Conway in the future.

Great work!

We love it!

I love the park! Great job Conway!

Thank you guys! Keep up the awesome work

Visited this past weekend and it's a beautiful park. Can't wait to see what it looks like after a nice heavy rain. Also looking forward to seeing it bloom in the spring. Just lovely.

Providing proper staffing and pay to the police and fire departments should be a much higher priority than this.

I don't know what Low Impact Development is and I wasn't aware there were events at the park

Great park and love this feature is added. Also love the plants. Thanks for continuing to invest in our community.

I love this green space. I wish we could have more green spaces.

N/A

Nice little park

I like to say bioswale.

We love all the fantastic parks! We visited the one behind Hendrix yesterday and it's looking gorgeous! We love reading about the native plants and such as well! We are so thankful for the beauty and restoration to the city of Conway!!

We are not home owners so we will not have a "next project" nor do we plant anything, native or otherwise, because we are renting. However I truly appreciate the LID techniques used at this park and it is exciting to think that this type of thing may become more common with local builders since we do hope to build someday.

This is the best park we have in Conway! I would love to see smaller scale versions of this on every corner in Conway and convert all or areas of existing parks to something similar to improve storm water and increase our urban/suburban biodiversity!

I am very happy to see liw impact and native plants being considered for new developments. I feel such actions will make Conway a wonderful place to visit and live in the future.

I just visited a few days ago and it is a lovely place. Keep up the good work. More green, more native plants, less concrete... I'm all for it!

Could ya'll host some cooperative extension training sessions on how to best incorporate native species while also staying within City of Conway guidelines?

This would be great to offer to individual citizens that are interested in this approach but even better for HOA's that might be willing to enact changes to their policies prohibiting this type of LID.

Love that the city is planting native and using these techniques! Please continue on more projects!!

I love this site! The city of Conway did an amazing job. This was my grandparents place when it was J F Hoyt Scrap Iron and Metal.

The park is beautiful and should be a shining example of how to repurpose problematic urban spaces!

This is a wonderful concept!

Money could have been spent on other and better things.

This is great! I love that the City of Conway is doing this! Thank you!
SW

Never been to MLK Square. Don't plan to visit.

I think the park is a beautiful addition to downtown that helps teach lessons in history and how to make a space beautiful by working with the environment.

The park is beautiful and a great way to deal with storm drainage.

Absolutely love this park!

The park is so beautiful and nice! I love all of the local Black history noted on the sidewalks in the park!!!

I've learned a great deal about the capabilities and benefits of native plant species.

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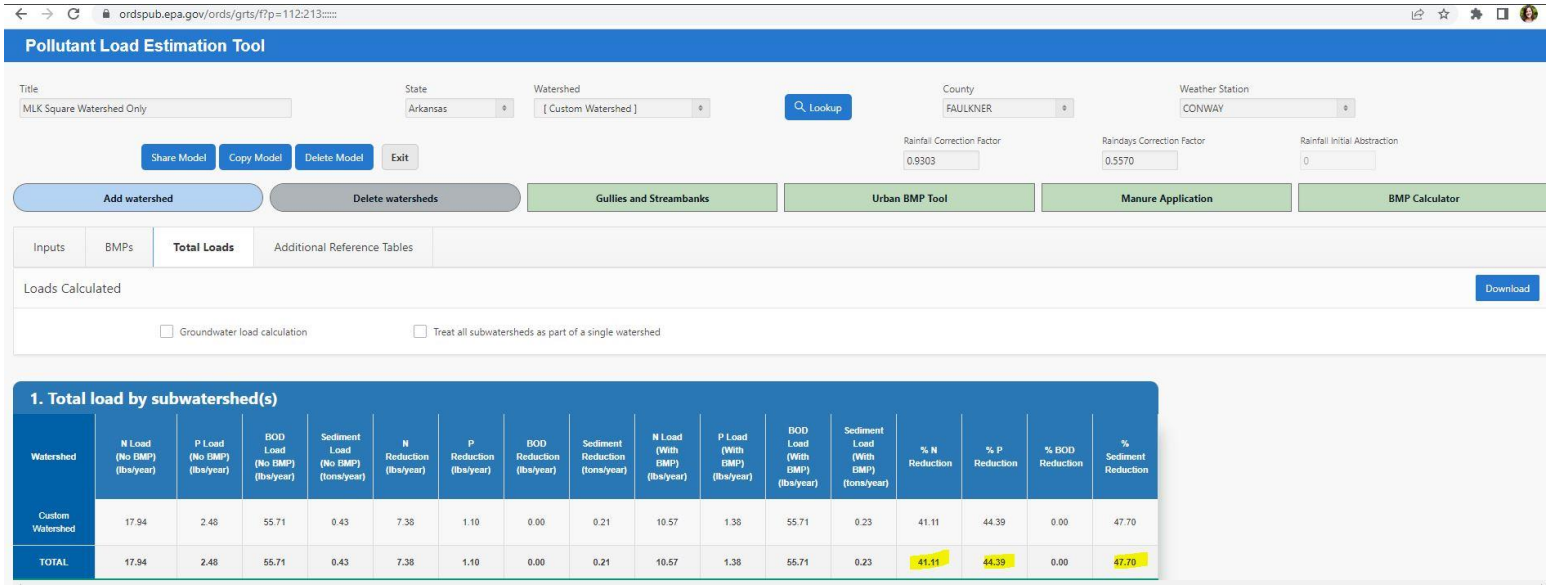
Appendix E Load Reduction Estimate Information



Watershed	N Load (No BMP) (lbs/year)	P Load (No BMP) (lbs/year)	BOD Load (No BMP) (lbs/year)	Sediment Load (No BMP) (tons/year)	N Reduction (lbs/year)	P Reduction (lbs/year)	BOD Reduction (lbs/year)	Sediment Reduction (tons/year)	N Load (With BMP) (lbs/year)	P Load (With BMP) (lbs/year)	BOD Load (With BMP) (lbs/year)	Sediment Load (With BMP) (tons/year)	% N Reduction	% P Reduction	% BOD Reduction	% Sediment Reduction
Custom Watershed	17.94	2.48	55.71	0.43	7.38	1.10	0.00	0.21	10.57	1.38	55.71	0.23	41.11	44.39	0.00	47.70
TOTAL	17.94	2.48	55.71	0.43	7.38	1.10	0.00	0.21	10.57	1.38	55.71	0.23	41.11	44.39	0.00	47.70

1. Total load by subwatershed(s)

Watershed	N Load (No BMP) (lbs/year)	P Load (No BMP) (lbs/year)	BOD Load (No BMP) (lbs/year)	Sediment Load (No BMP) (tons/year)	N Reduction (lbs/year)	P Reduction (lbs/year)	BOD Reduction (lbs/year)	Sediment Reduction (tons/year)	N Load (With BMP) (lbs/year)	P Load (With BMP) (lbs/year)	BOD Load (With BMP) (lbs/year)	Sediment Load (With BMP) (tons/year)	% N Reduction	% P Reduction	% BOD Reduction	% Sediment Reduction
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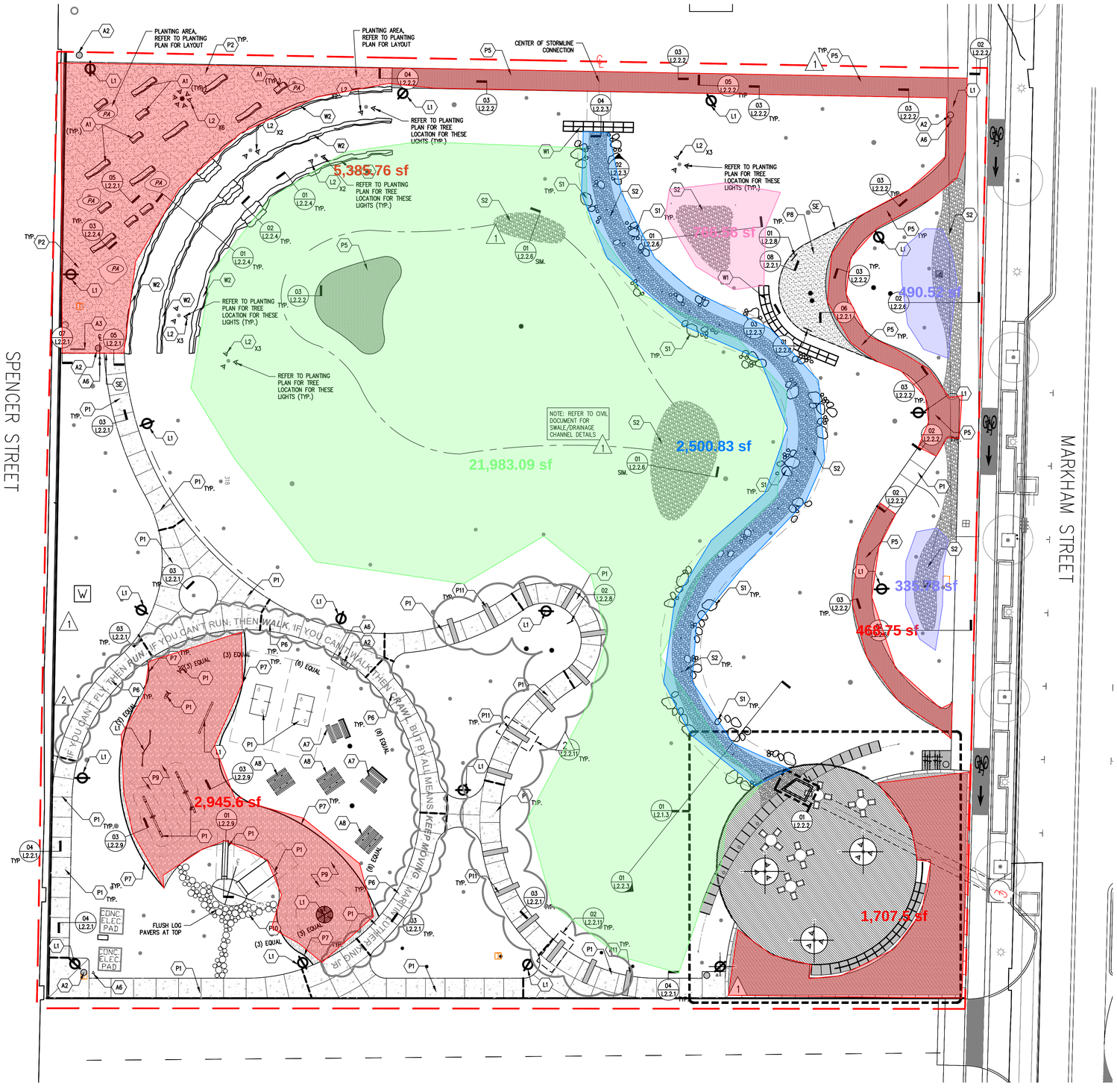
Utilizing the Pollutant Load Estimate Tool from EPA, rough estimates of load reductions were calculated for the implemented LID techniques installed in the park. The results are that the infiltration basin, vegetated swales, and bioretention areas reduce Nitrogen by 41%, Phosphorus by 44% and Sediment loads by 47%.

Additionally, the phytoremediation plants that were integrated into the park specifically target lead, cadmium, zinc, and petroleum classes of contaminants.



AREAS:
Pervious Pavement - 10505 sf
Infiltration Basin - 21983 sf
LID Infiltration Swale - 2500 sf
Wetland Detention (north rain garden) - 766 sf
Bioretention Facility (rain garden) - 825 sf

MARKHAM STREET WATER QUALITY DEMONSTRATION PROJECT

PROJECTED BOUNDED BY MARKHAM, SPENCER STREET
CONWAY, ARKANSAS 72032

Client

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CONWAY, ARKANSAS 72032

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Consultant

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FAYETTEVILLE, ARKANSAS 72701
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Stamp

Licensed Landscape Architect LEAH WALTER 2035 Arkansas

12/14/2021

Revisions

1	PROPOSED CHANGE 01	08/20/2021
2	PROPOSED CHANGE 02	12/14/2021
3		
4		
5		

Date
11 JANUARY 2021
Phase
ISSUE FOR CONSTRUCTION
Job Number
CAKT001

Scale
0 8" 16"
1/16" = 1'-0"

North

Drawing Title

OVERALL LAYOUT AND MATERIALS PLAN

Drawing Number
FOR CONSTRUCTION

L2.1.0

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