



From Bus Station to Water Reclamation: A Stormwater Improvement and Rainwater Harvesting Project

May 19, 2022 / 11:00 a.m. - 12:00 p.m. (Eastern)

www.SESWA.org

Today's Presenters



*Eric Dawalt, PE
President
Ridgewater, LLC*

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*Samuel Lee, PE
Senior Water Resources Engineer
Stantec*

samuel.lee2@stantec.com



Greyline Station

From Bus Station to
Water Reclamation:
A Stormwater
Improvement and
Rainwater Harvesting
Project

Lexington, Kentucky

May 19, 2022

Sam Lee, P.E. - Stantec
Eric Dawalt, P.E. - Ridgewater



LEXINGTON

Funded by the LFUCG Stormwater Incentive Grant Program



Outline

- WHERE: Background
- WHY: Problems and Project Need
- WHO: Stakeholders and D/B Team
- WHAT:
 - Goals
 - Project Design
- HOW:
 - Construction
 - Results and Benefits

WHERE: Background

Greyline Station



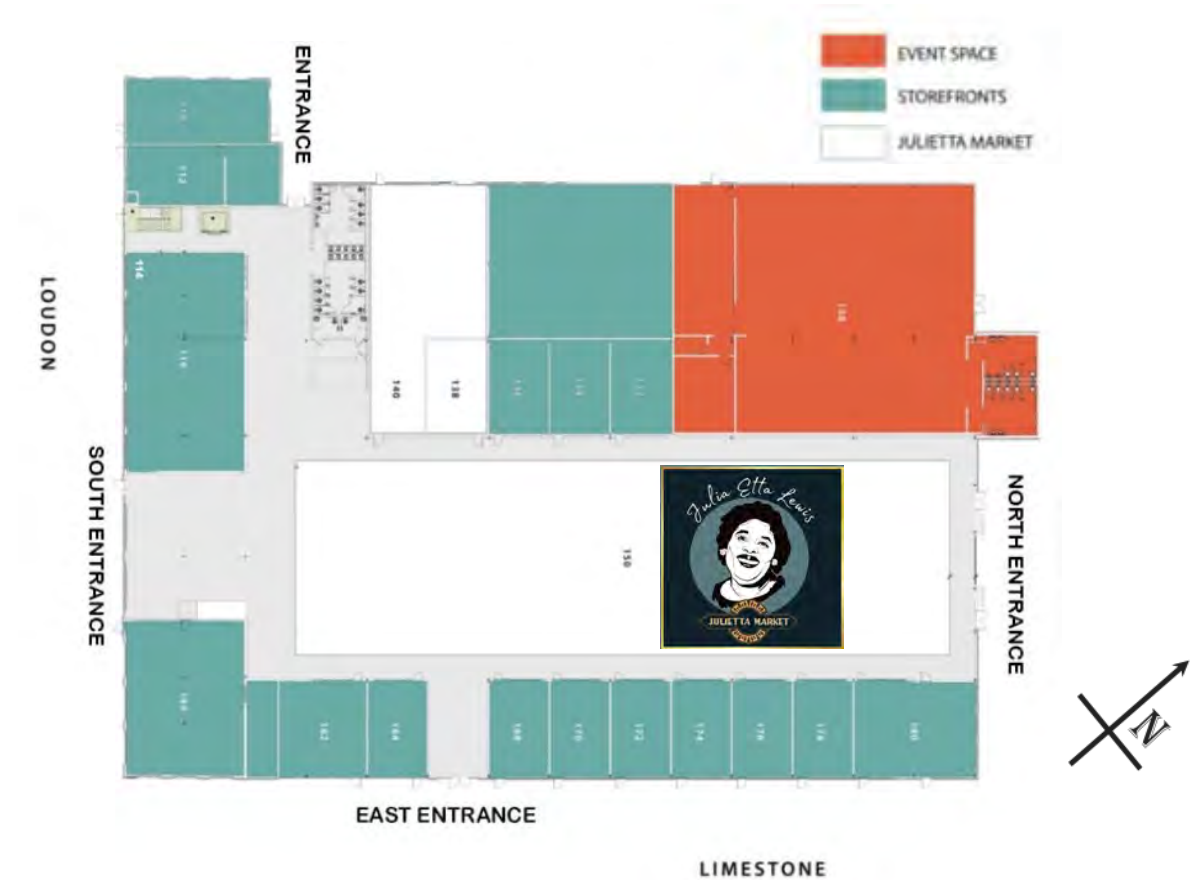
Greyline Station

- 1928 – Built by eventual Southeastern Greyhound for bus maintenance and headquarters.
- 1940's – Lexington's largest private employer.
- 1960's – Vacant
- 1972 – City Transit Authority purchased for Lextran
- 2000-2007 – UST's removed.
- 2014 – Listed on National Register of Historic Places
- **2017 – Purchased by Chad Needham to redevelop**



Greyline Station

- Redeveloping northern urban core.
- 65,000 sq.ft.



Julietta market

- 23,000 sq.ft. nonprofit public market.
- Business startup incubator.
 - 60 small business kiosks
 - 20 pop-up spaces
 - 7 food stalls
 - community art gallery
 - a shared kitchen
 - event space for cultural and community events.



WHO: Stakeholders and Project Team

Stakeholders:



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Design/Build Team:



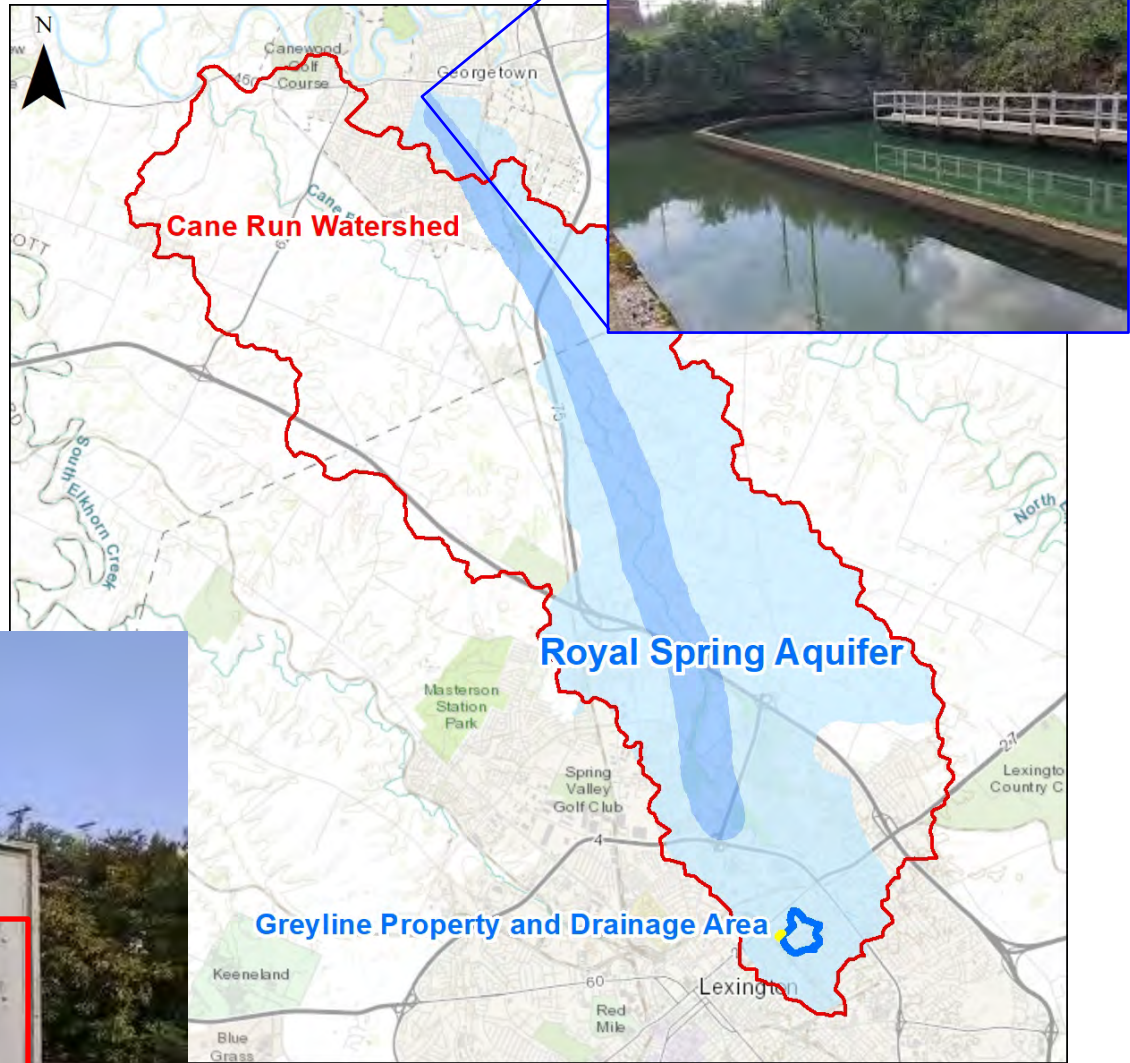
Stantec

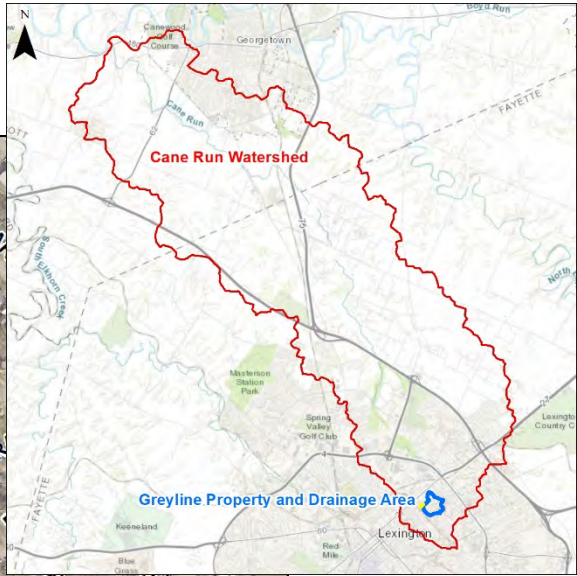


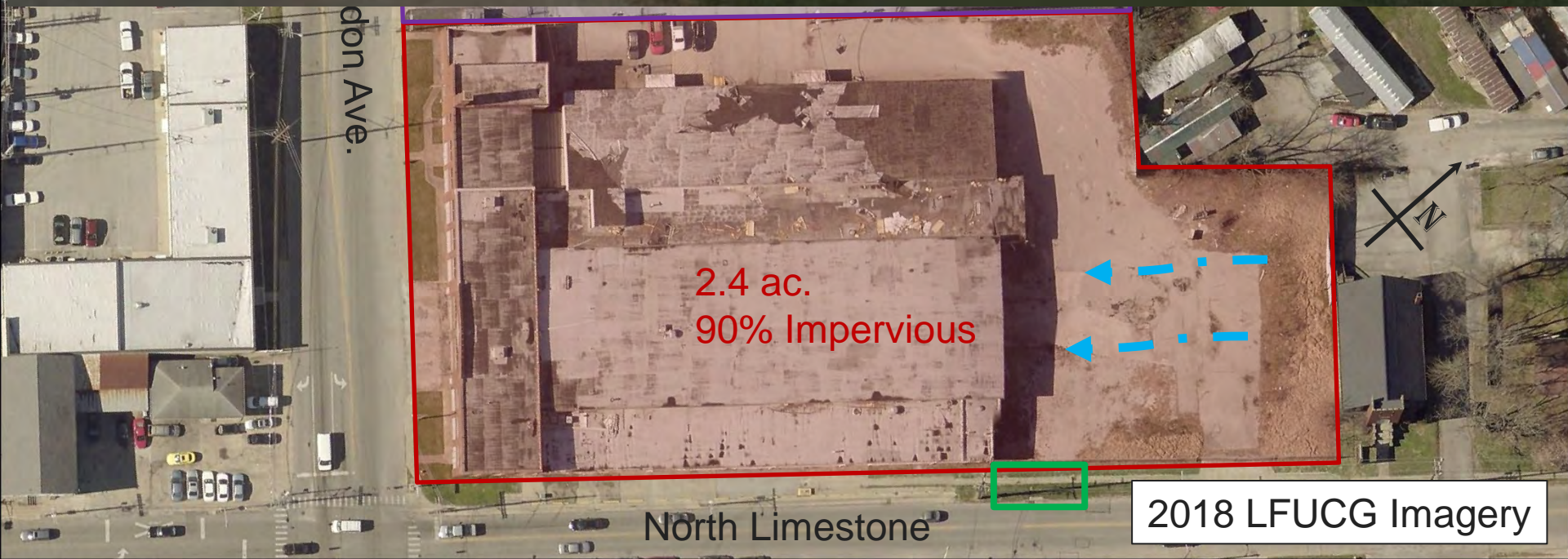
WHY: Problems and Project Need

Water Quality Issues:

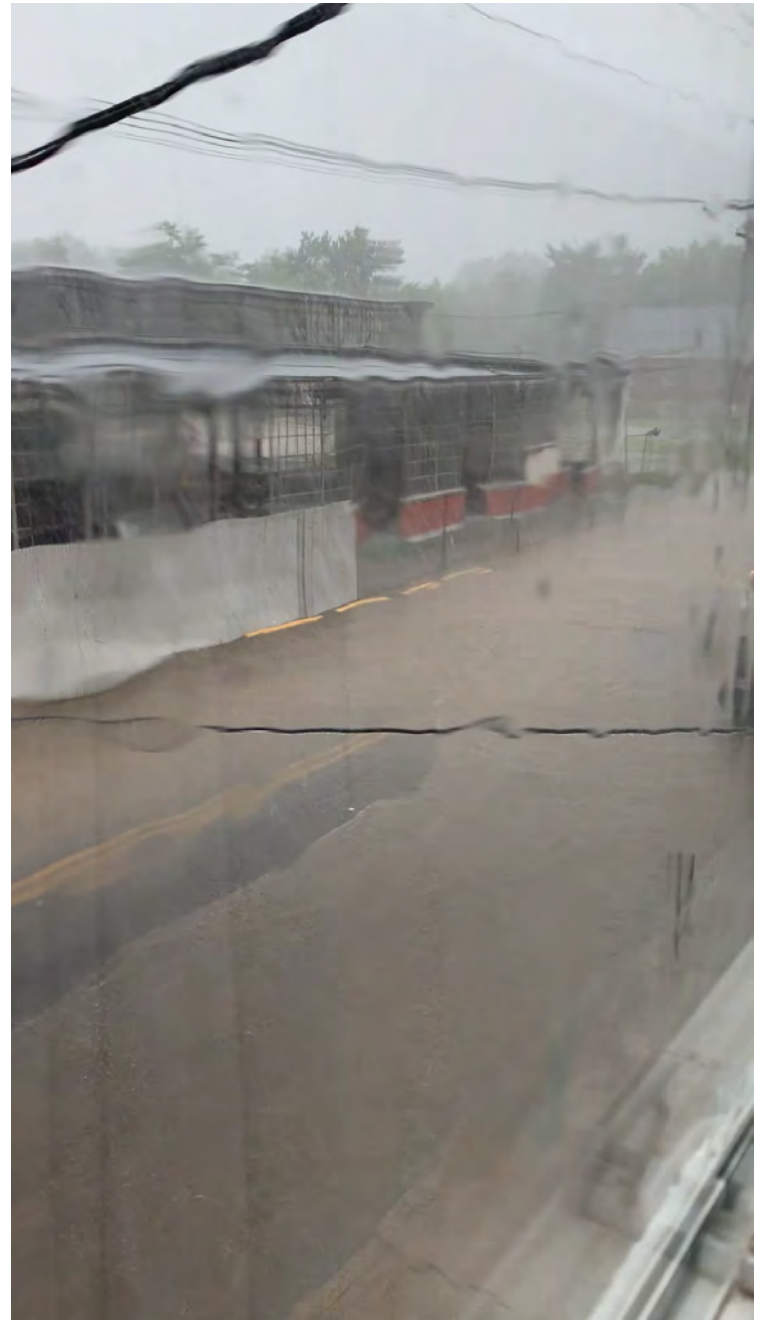
- ❖ Cane Run is one of the most polluted streams in Central Kentucky
- ❖ 303(d) list
 - Urban stormwater runoff
 - Sedimentation/ Siltation







Flooding July 15, 2019



Summary of Problems and Project Need

- ❖ Site was 90% impervious.
- ❖ Polluted stormwater runoff into Cane Run and Royal Spring.
- ❖ Building and Road flooding:
 - Building lower than parking lot.
 - Undersized storm sewer (partly under building).



Must Have Goals

1. Meet LFUCG Stormwater Grant requirements:

- ↑ Water Quality
- ↓ Runoff, flooding
- Educate @ stormwater

Specifically:

- a. Remove impervious area (5,600 sq.ft.)
 - i. Permeable Pavement
 - ii. Bioretention
 - iii. Green Street/Sidewalk Retrofit
 - iv. Landscape
- b. Underground Detention (6,000 cu.ft.)
- c. WaterStop: Bus stop and rainwater harvesting cistern

Must Have Goals (cont'd):

1. **Meet LFUCG Grant requirements.**
2. Meet budget and schedule.
3. Offset some of cost of redeveloping site.
4. Be Cool / Remarkable.
5. Improve Streetscape safety/aesthetics
6. **Reduce/eliminate building flooding**

Like to Have Goals:

6. **Change paradigm of stormwater on-site from problem to a beneficial resource**
7. Harvest water for non-potable uses (bathrooms, landscaping, etc.)
8. Amenity space for tenants
9. Lighting
10. Experience water (fountain, drown out street noise)
11. Raise the bar for redevelopment projects, be award-winning project
12. Build as much parking lot as possible
13. Create outdoor space for visitors and community
14. Skateboarding feature, Stormwater putt-putt, etc.

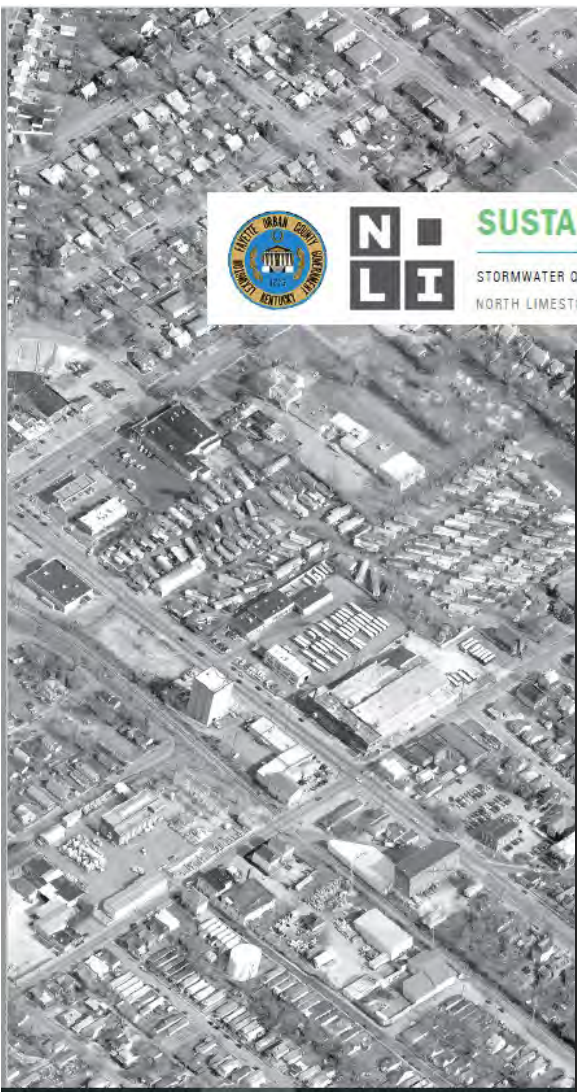
Project Design

2012 LFUCG Stormwater Grant-funded



SUSTAINABILITY PLAN

STORMWATER QUALITY INCENTIVE GRANT PROGRAM
NORTH LIMESTONE NEIGHBORHOOD ASSOCIATION



3 - GREYHOUND PROPERTY (LEXTRAN)

The building at 101 West Loudon Avenue was built in 1928 by Consolidated Coach Corp., which later changed its name to Southeastern Greyhound Lines. It was used as the company's headquarters and maintenance facility until the 1960s. The structure, now more than 80 years old, has been deemed historically significant. The Transit Authority of Lexington (Lextran) purchased the property in 1972 with the intention of renovating and improving the property. These alterations have yet to begin and may not happen due to a changing vision at Lextran and pressure from within the community to preserve the building. The property is comprised almost entirely of impervious surfaces. As additions to the building were created to suit growing needs for indoor space the roof developed into a patchwork of varying elevations. Similarly, more and more of the ground surface was paved with gravel and asphalt until there was strikingly little green space left on the lot. This sort of disjointed, build-as-you-go approach to property development inevitably lead to inadequate handling of the stormwater being generated from the site. This conceptual plan is

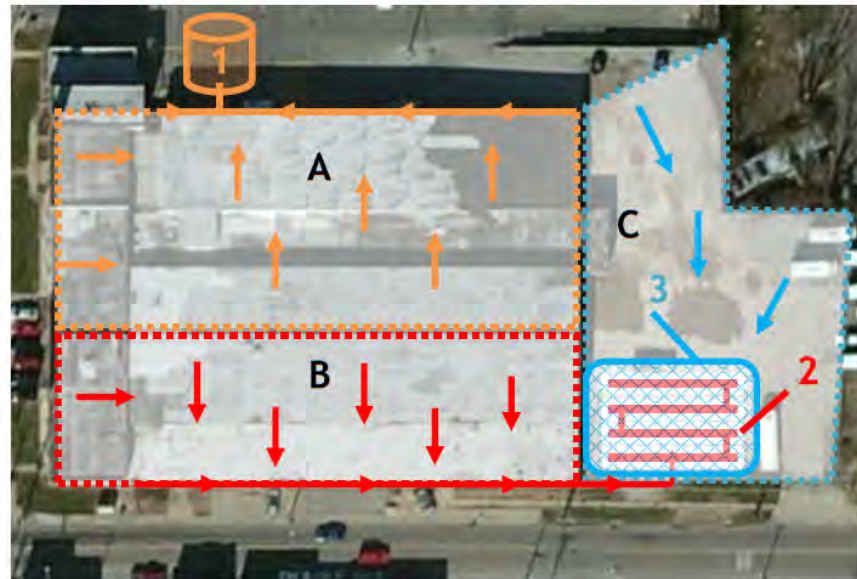
meant to address the runoff from roof surfaces (Figure 1, Items A & B) and the large, part-gravel, part asphalt parking lot (Figure 1, Item C) which is slowly shrinking over time as stormwater washes away these paving materials.

Proposed Best Management Practices (BMPs)

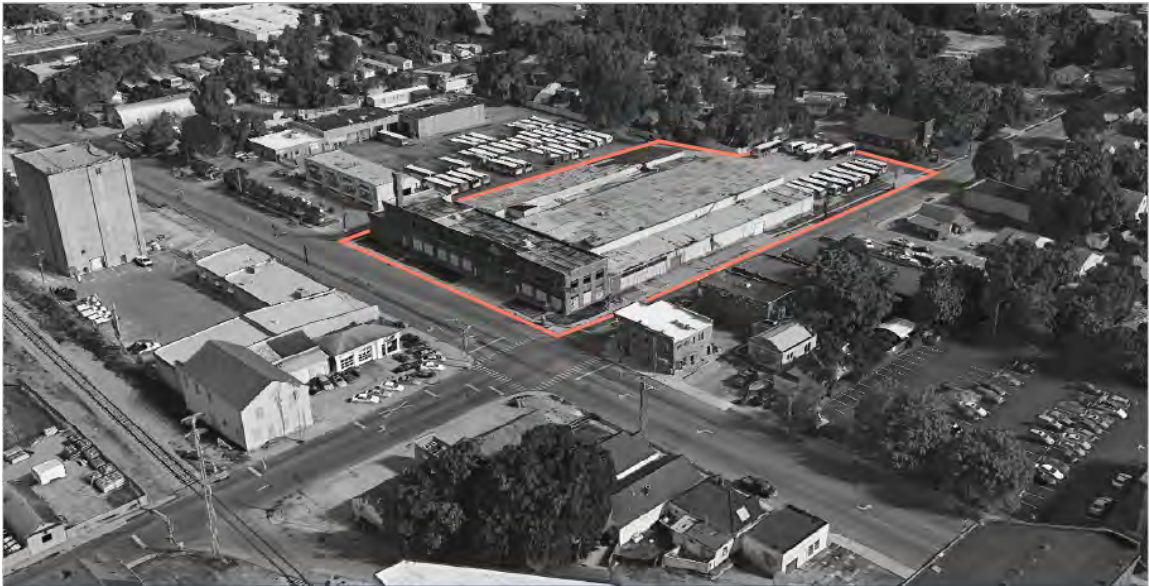
Based on the site assessment, impervious areas, associated water quality volumes, potential opportunities or restrictions and potential pollutant types, the following BMPs are being recommended:

1. Rainfall Harvest Tank (Drains Impervious Area A; 29,350 Ft²)
2. Underground Infiltration/Detention Chamber (Drains Impervious Area B; 25,200 Ft²)
3. Permeable Pavement (Drains Impervious Area C; 24,375 Ft²)

Estimated Gallons Captured Annually - 90% - 1,992,462 gal.
Estimated BMP Implementation Cost - \$325,993 - \$0.16p/g



2018 - LFUCG Stormwater Grant awarded



101 LOUDON AVENUE DESIGN & CONSTRUCTION

Stormwater Quality Projects
Incentive Grant Program
FY 2018



GREENING LIMESTONE

"WATER STOP"
There is an existing Loudon bus stop at the corner of Loudon and Limestone. This would make an ideal location for a stormwater education feature, visible to the ArtBorgs around Limestone.

NATIVE BUFFER
The native buffer will be 10' high or lower native grasses that will filter the sidewalk runoff and provide physical separation for pedestrians from the roadway.

RAINWATER HARVESTING
The rainwater harvesting feature will capture stormwater for irrigation and educational purposes in a highly visible location near the bus stop.

BIORETENTION
The bio-retention basins will run along Limestone side the building and capture stormwater from the down spouts helping alleviate flooding, cleaning water and dramatically improving the streetscape.

GREEN ROOF
The demonstration green roof is a concept the owner would like to pursue in future phases of work. This space will include education about green roof technology as well as rainwater harvesting.

2019 – Design/Build Team selected, and Design begins
 2020 - Design Complete, Construction begins (along with Covid)

PLANS FOR CONSTRUCTION

GREYLINE STATION

STORMWATER IMPROVEMENTS PROJECT

FAYETTE COUNTY, KENTUCKY

PREPARED FOR

NORTHYARD LLC

LEXINGTON, KENTUCKY

PREPARED BY



STANTEC CONSULTING SERVICES INC.
 3052 BEAUMONT CENTRE CIRCLE
 LEXINGTON, KENTUCKY 40513
 (858) 422-3000
www.stantec.com

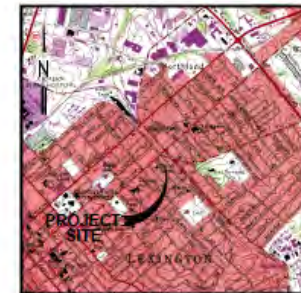


LEXINGTON

Funded by the LEUCOG Stormwater Incentive Grant Program

INDEX OF SHEETS

- 1 COVER SHEET
- 2 GENERAL NOTES AND CALCULATIONS
- 3A SITE SURVEY (BY OTHERS)
- 3B EXISTING CONDITIONS
- 4A SITE PLAN
- 4B GRADING PLAN
- 5-7 DETAILS



VICINITY MAP
 NOT TO SCALE

STANTEC CONSULTING SERVICES INC. FOR NORTHYARD LLC (2020) 10/13/20
 1000 N. GARDEN ST. SUITE 200
 LEXINGTON, KY 40504

COVER SHEET
 GREYLINE STATION
 STORMWATER IMPROVEMENTS PROJECT
 LEXINGTON, FAYETTE COUNTY, KENTUCKY

PROJECT NO.	17080011
DATE	1/25/20
DRAWN BY	EP
CHECKED BY	EP
DATE	1/25/20
SCALE	1"=1'
REVISION	
1	
2	
3	
4	
5	
6	
SHEET	

1 OF 7

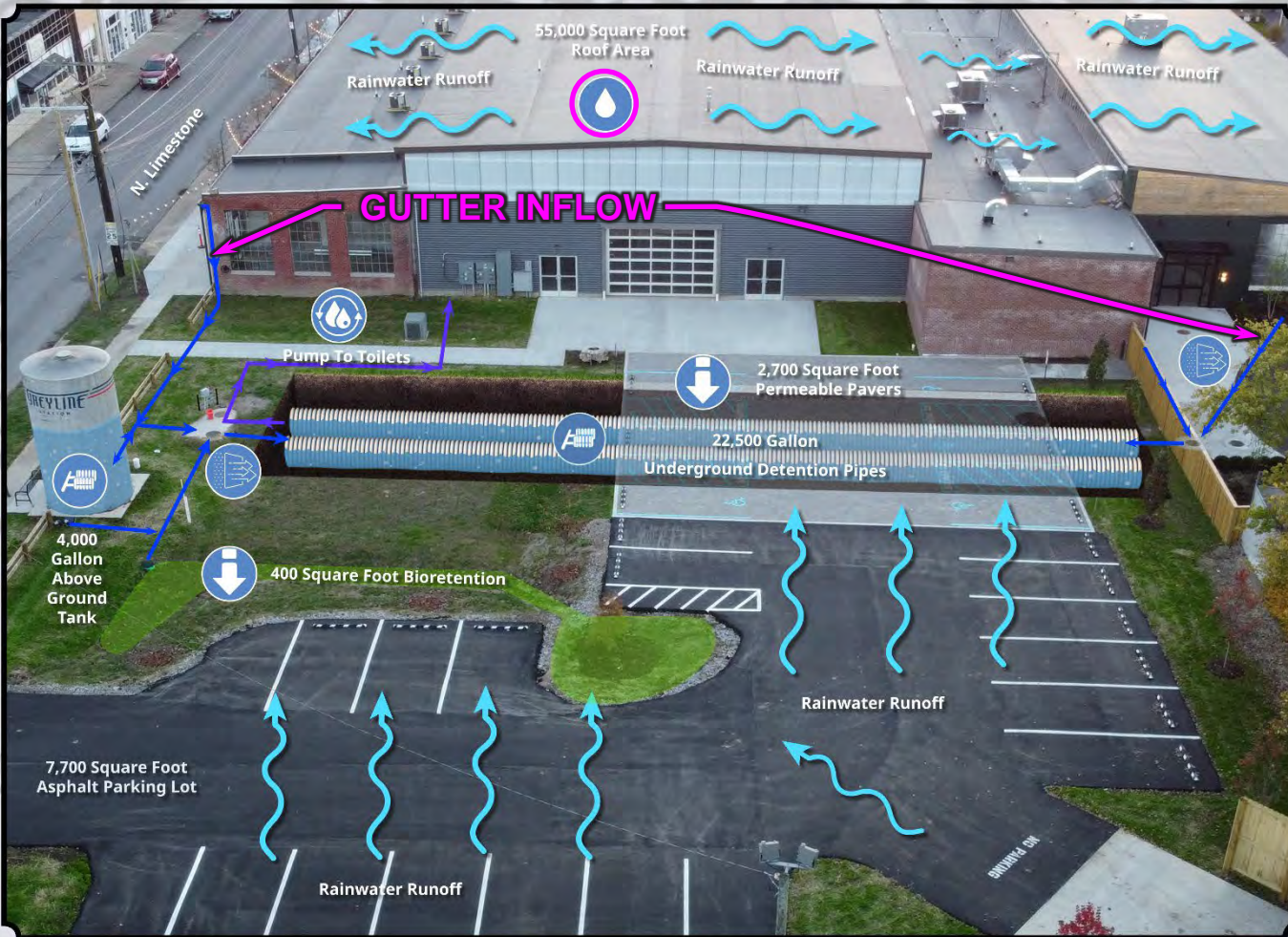
ISSUED FOR CONSTRUCTION

HOW: Construction





STORMWATER RETENTION & RAINWATER HARVESTING SYSTEM



<p>Drainage Area 1.75 acres or 75,000 Square Feet</p>	<p>Stormwater Quality Volume Treated 6,300 cubic feet or 47,000 gallons for every 1.2" of rainfall</p>	<p>Water Stored Onsite 26,500 gallons</p>
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SCHOOL
SPEED
LIMIT
25
WHEN
CHILDREN
ARE PRESENT













RADIO LEX
WLXU 93.9FM ENG
WLXL 95.7FM ESP

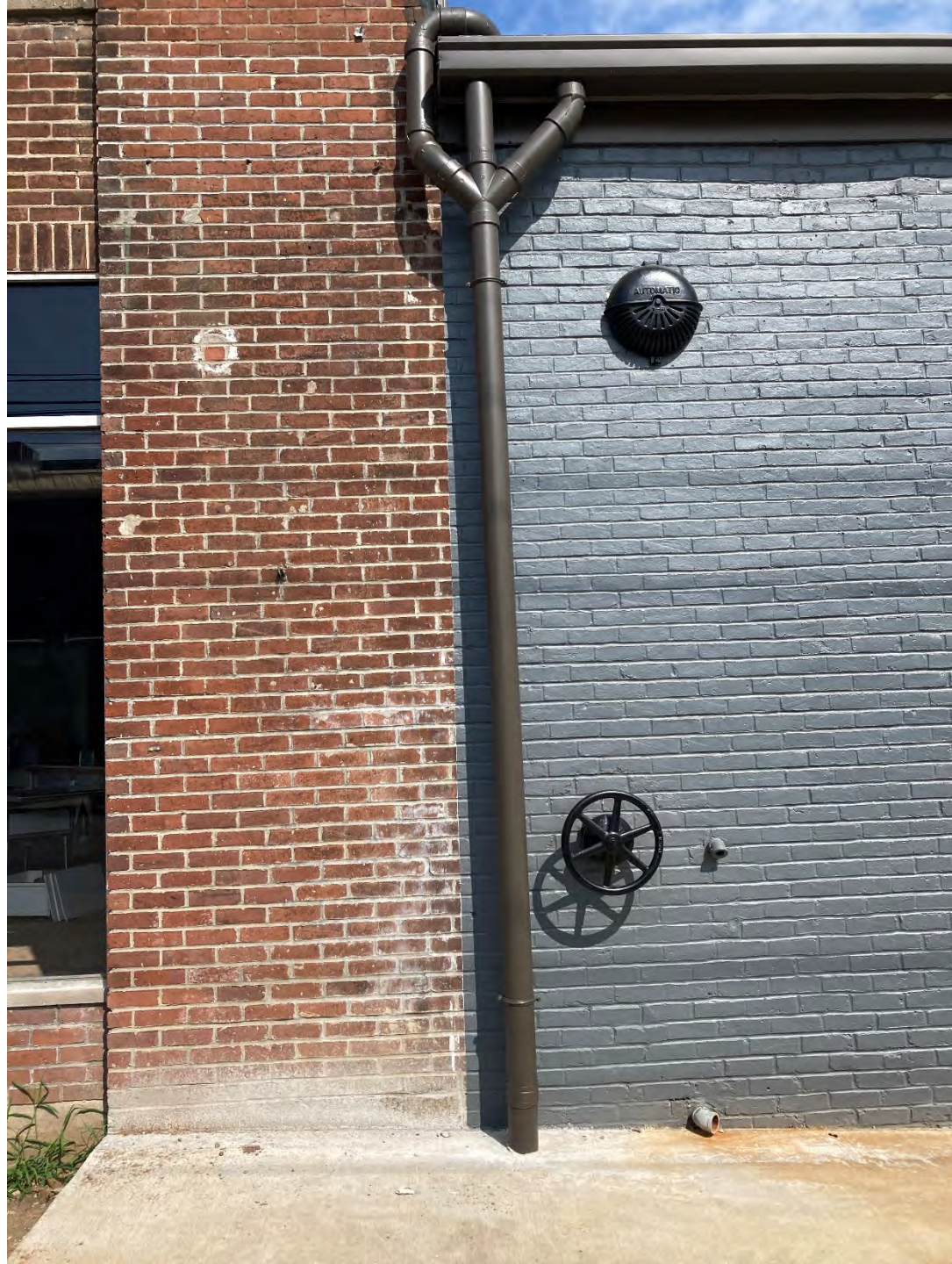
therapy

SUITE 180

RADIO LEX
WLXU 93.9FM ENG
WLXL 95.7FM ESP

IMMIGRANTS & REFUGEES
BELONG
HERE





Clean

Baffles





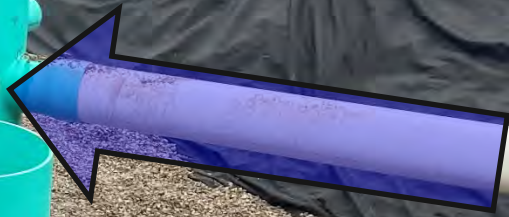
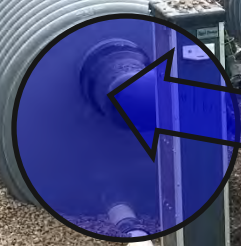




BARBER COLLEGE

#136

#7







BARBER COLLEGE

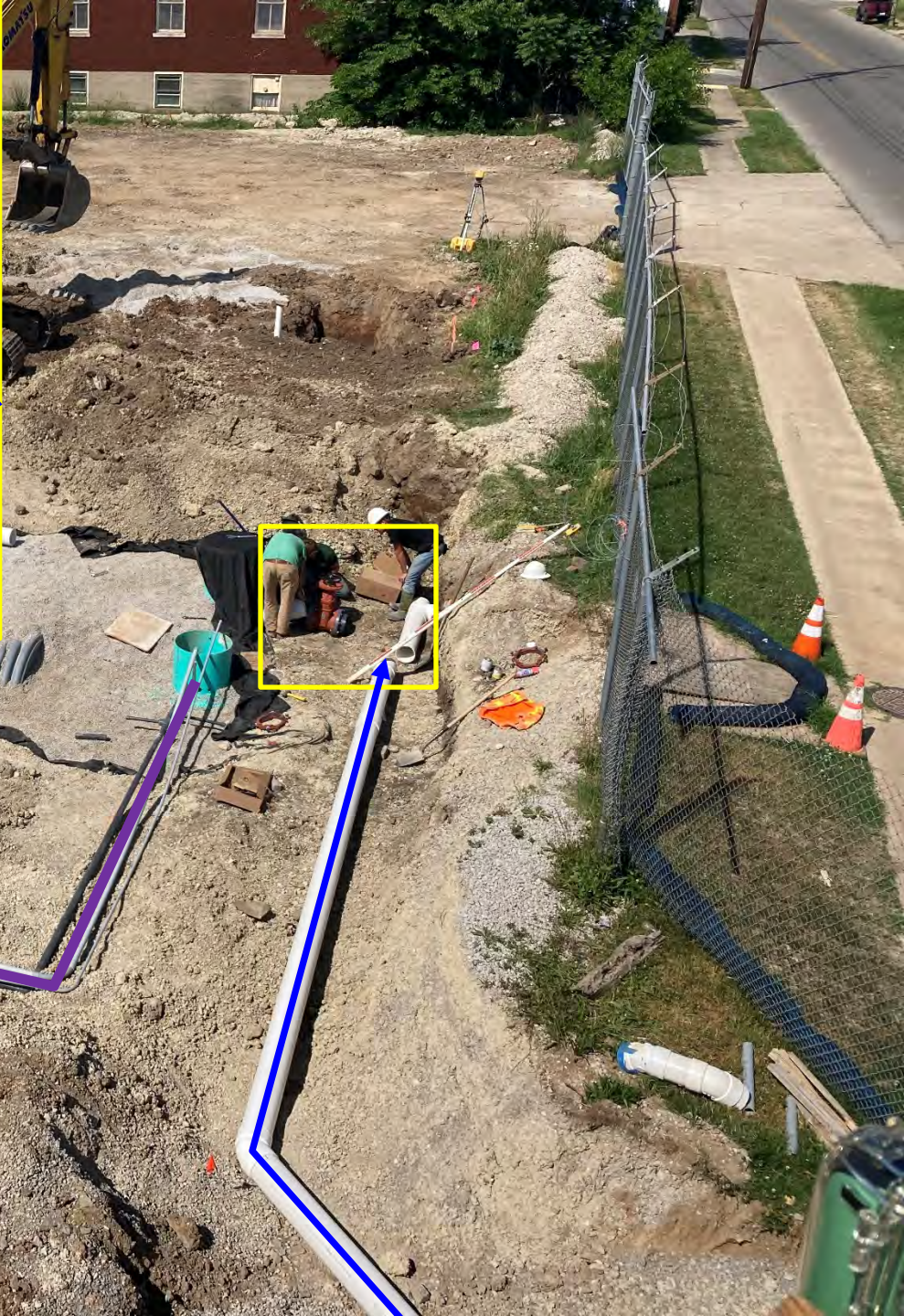






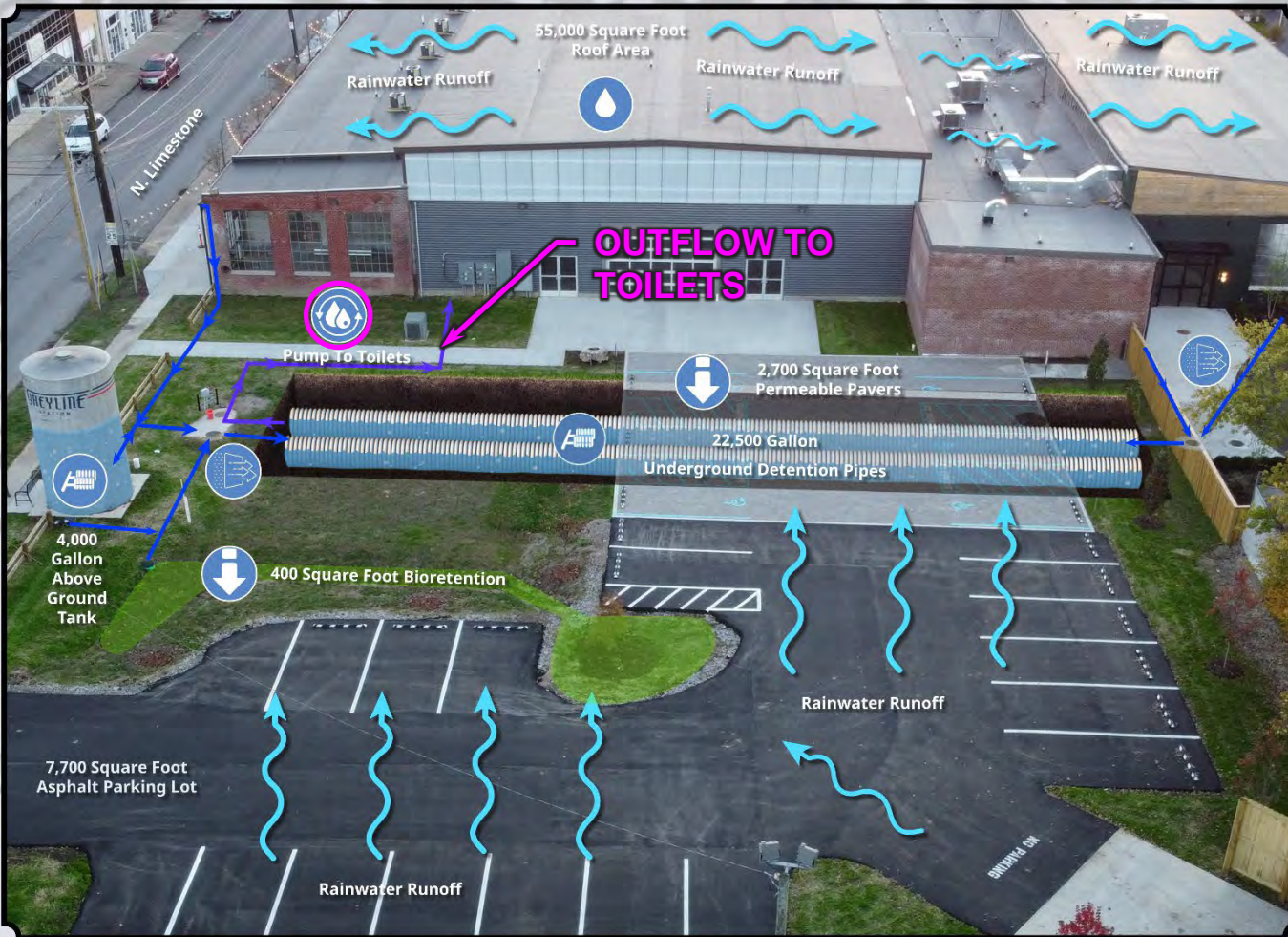




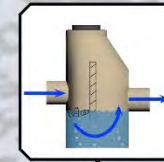




STORMWATER RETENTION & RAINWATER HARVESTING SYSTEM



COLLECT
Rainwater runoff is collected from the roof in gutters, downspouts, and underground pipes.



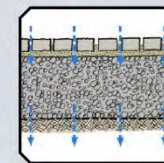
CLEAN
A baffle system in a manhole removes pollutants that float or settle before runoff enters the underground detention.



STORE
Cleaned rainwater is stored in two underground 48-inch diameter pipes and an above ground tank.



REUSE
Rainwater is pumped to use in toilets or to irrigate landscape.



INFILTRATE
Parking lot runoff is infiltrated to recharge groundwater via the permeable pavers or the bioretention area.

<p>Drainage Area 1.75 acres or 75,000 Square Feet</p>	<p>Stormwater Quality Volume Treated 6,300 cubic feet or 47,000 gallons for every 1.2" of rainfall</p>	<p>Water Stored Onsite 26,500 gallons</p>
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Reuse

Pump & Flush











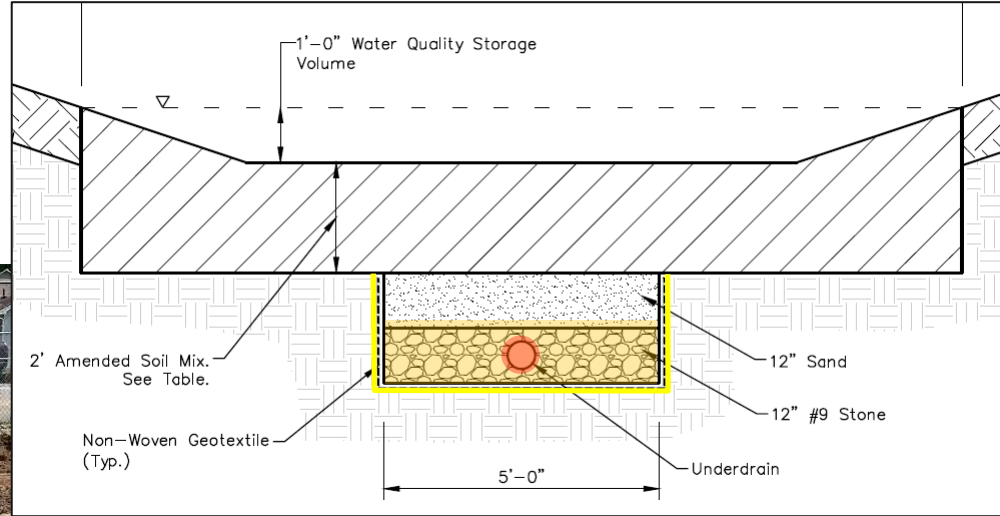


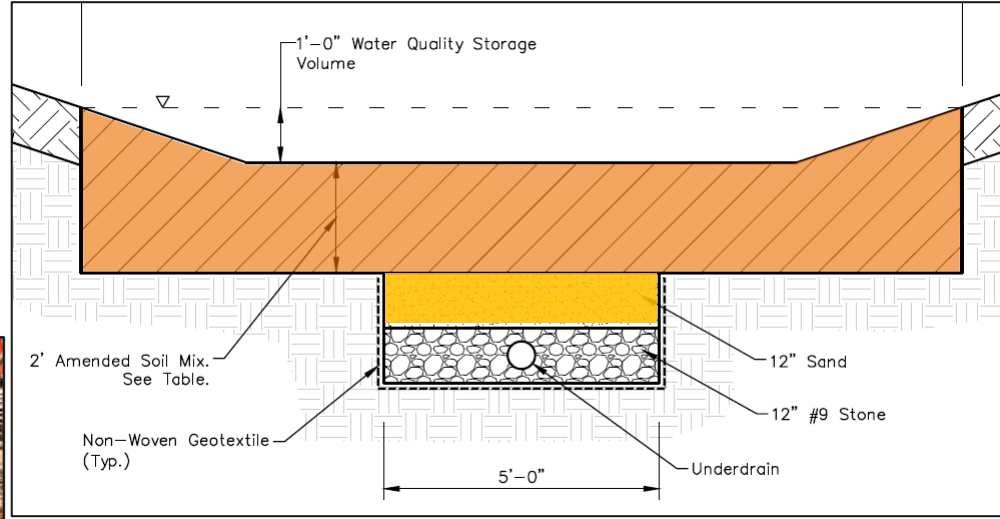
GREYLINE
STATION









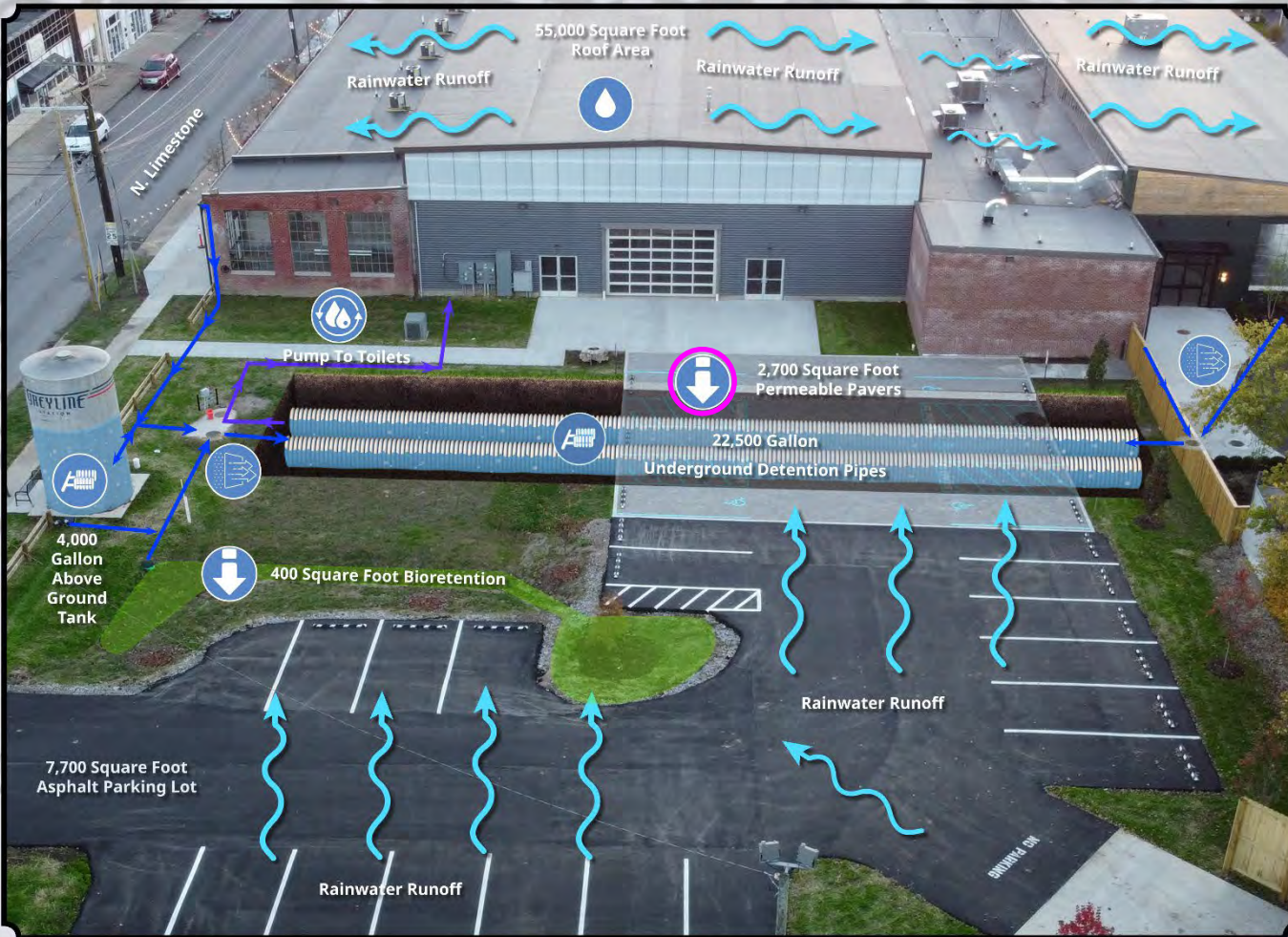


AMENDED SOIL MIX	
Sand	70%
Topsoil	15%
Compost	15%

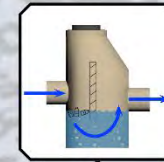




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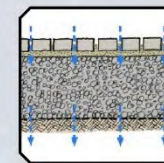
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Drainage Area
1.75 acres or 75,000 Square Feet

Stormwater Quality Volume Treated
6,300 cubic feet or 47,000 gallons
for every 1.2" of rainfall

Water Stored Onsite
26,500 gallons





BARBER COLLEGE

FedEx FedEx

312

1124



Benefits and Results

RESULTS:

Must Have Goals:

- ✓ **Met LFUCG Grant requirements.**
- ✓ Met budget and schedule.
- ✓ Offset some of cost of redeveloping site.
- ✓ Cool / Remarkable.
- ✓ Improved Streetscape safety/aesthetics.
- ✓ **Reduced/eliminated building flooding.**

↑ Water Quality

↓ Runoff, flooding

Educate @ stormwater

Like to Have Goals:

- ✓ Change paradigm of stormwater on-site from problem to a beneficial resource
- ✓ Harvest water for non-potable uses (bathrooms, landscaping, etc.)
- ✓ Amenity space for tenants
- ✓ Lighting
- ✓ Experience water (fountain, drown out street noise)
- ✓ Raise the bar for redevelopment projects, be award-winning project
- ✓ Build as much parking lot as possible
- ✓ Create outdoor space for visitors and community
- Skateboarding feature, Stormwater putt-putt, etc.

BENEFITS

Innovation:

- ✓ First ADS underground rainwater harvest system in Eastern U.S. using gasketed polypropylene pipe.
- ✓ Largest retail RHWS in Lexington.

Value:

- ✓ Treated 20% of entire 5-acre site with WQ units.
- ✓ Reduced/eliminated building flooding at small additional cost.
- ✓ Recycled:
 - ✓ 1,000 tons of gravel.
 - ✓ 18-foot high aluminum water tank
 - ✓ 8" gate valve from fire suppression system.

Sustainability

- ✓ ½" rainfall = 12,000 toilet flushes.
- ✓ Removed 1.75 acres of stormwater runoff from ½" rain.

2022 KY GRAND AWARD WINNER

Greyline Station Stormwater Improvements & Rainwater Harvesting System

ACEC ENGINEERING
excellence
AWARDS



LEXINGTON, KENTUCKY



Built in 1928, Greyline Station provides incubator space for small businesses, demonstrating how the community can grow through equitable access. In 2018 Northyard, LLC made plans with local architects to renovate the historic facility, preserving the original structure of brick and riveted steel trusses, but for years the structure had been impacted by stormwater runoff. Flooding from adjacent streets would pond onsite and flow into the building. Over time, much of the property had been paved over exacerbating ponding and cutting off infiltration and groundwater recharge. To redevelop the site sustainably and address these stormwater issues, the Ecogro/Ridgewater/Stantec team was engaged to plan, design, and build a stormwater retention and rainwater harvesting system to better manage stormwater on the property.

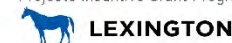
A key feature is the rainwater harvesting system that captures stormwater runoff from hardscape areas, including 55,000 ft² of roof area and 7,700 ft² of asphalt parking. Rainwater is treated through infiltration and water quality structures and stored in a 22,500-gallon underground detention system and 4,000-gallon above ground tank repurposed from a nearby farm as a site feature with the Greyline Station logo. Recycled water is reused to flush toilets and irrigate the new landscape plantings. Since opening day, the system has supplied more graywater than the facility uses. In addition to offsetting redevelopment costs, the system provides irrigation for greenspace, and by treating runoff with water quality treatment structures and bioretention, the Greyline Station property reduces pollution in Cane Run and the Royal Spring Aquifer downstream.

Owner:
NORTHYARD, LLC.
LEXINGTON, KY

PROJECT TEAM: LEXINGTON, KY



Funded in part by the LFUCG Stormwater Quality
Projects Incentive Grant Program



Education



GREYLINE STATION

WATER RETENTION AND RAINWATER HARVESTING



COLLECT

Rainwater runoff is collected from the roof in gutters, downspouts, and underground pipes.



CLEAN

A filtration system removes pollutants that float or settle.



STORE

Cleaned rainwater is stored in underground and in an above ground tank.



REUSE

Rainwater is pumped in toilets or to irrigate landscaping.



DID YOU KNOW!

Greyline Station collects all its roof water and uses it to flush all its toilets. Only a 1/2" inch of rain will provide 12,500 flushes!

Closing

Thank you!

Northyard, LLC – Owner/Developer of Greyline Station:

- Chad Needham – Owner, Visionary
- Germaine O’Connell - Office manager
- Ben Schulte – Field superintendent
- Field crew



LFUCG Div. of Water Quality – Grant funding, project oversight:

- Doug Baldwin, P.E. – Grant Manager
- Jennifer Carey, P.E. – MS4 Manager (formerly)
- Frank Mabson – SWQPIG Program Manager
- Greg Lubeck, P.E. – Deputy Director
- Charlie Martin, P.E. – Director

LFUCG Water Quality Fees Board





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Project Manager
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(859) 806-1089

Questions?



Thank You for Joining Us!

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info@SESWA.org