City of Brookings
Master Drainage Plan

COUNCIL STUDY SESSION

NOVEMBER 21, 2023

brookings
SOUTH DAKOTA

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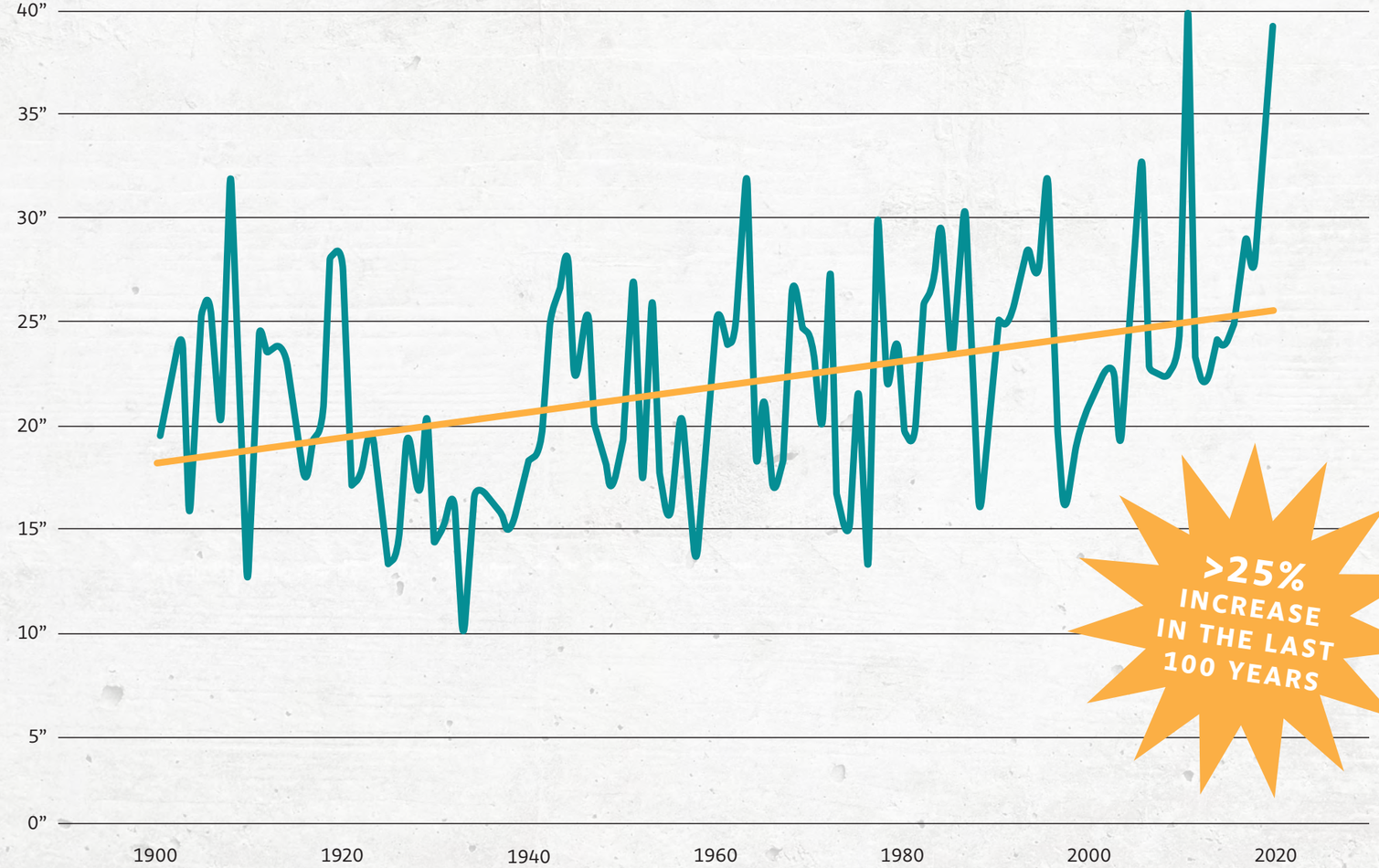
Plan Goals

REDUCE FLOODING

ENHANCE WATER QUALITY, RECREATION, AND AESTHETICS

ANNUAL PRECIPITATION TREND IN BROOKINGS, SD

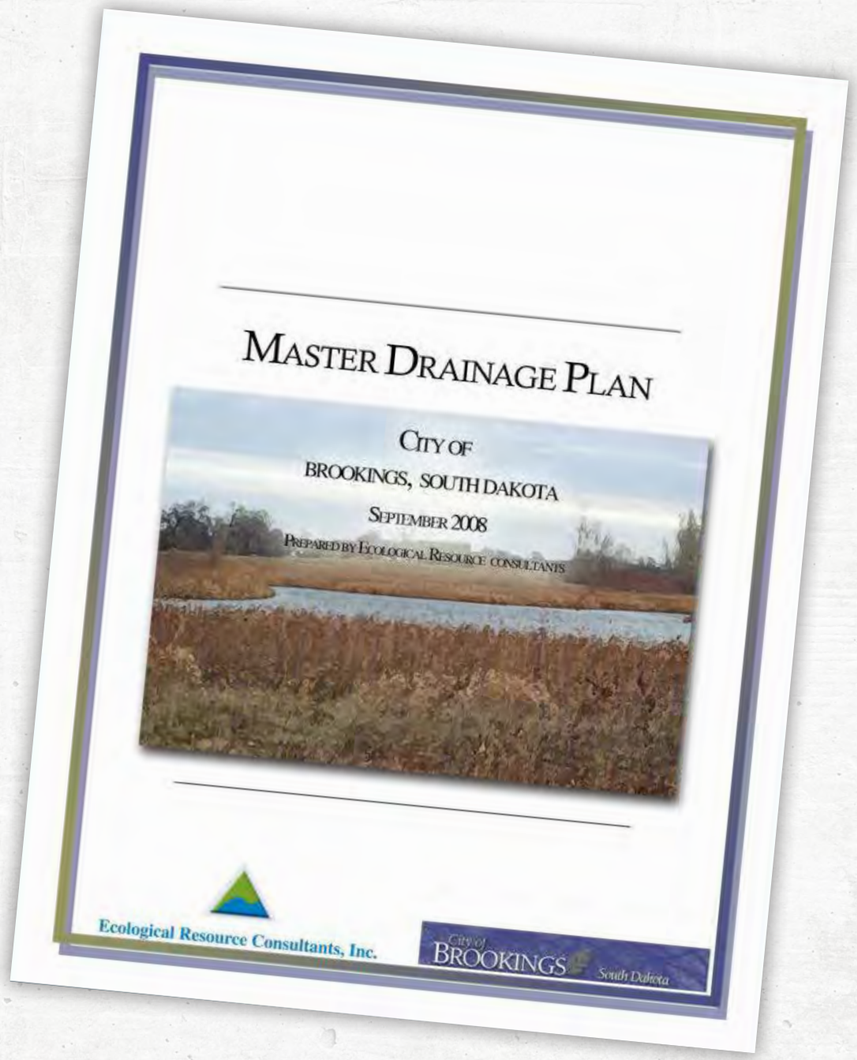
Source: National Oceanic and Atmospheric Administration (NOAA)



Plan Updates

- New technologies since 2008 plan
- Evaluation of existing conditions
- Plan Recommendations:
    - Improved project prioritization process
    - Provides recommended projects
    - Revisions to stormwater fees
    - New development standards
    - New inspection procedures

Note: Plan <u>does not</u> address Sixmile Creek (riverine flooding)



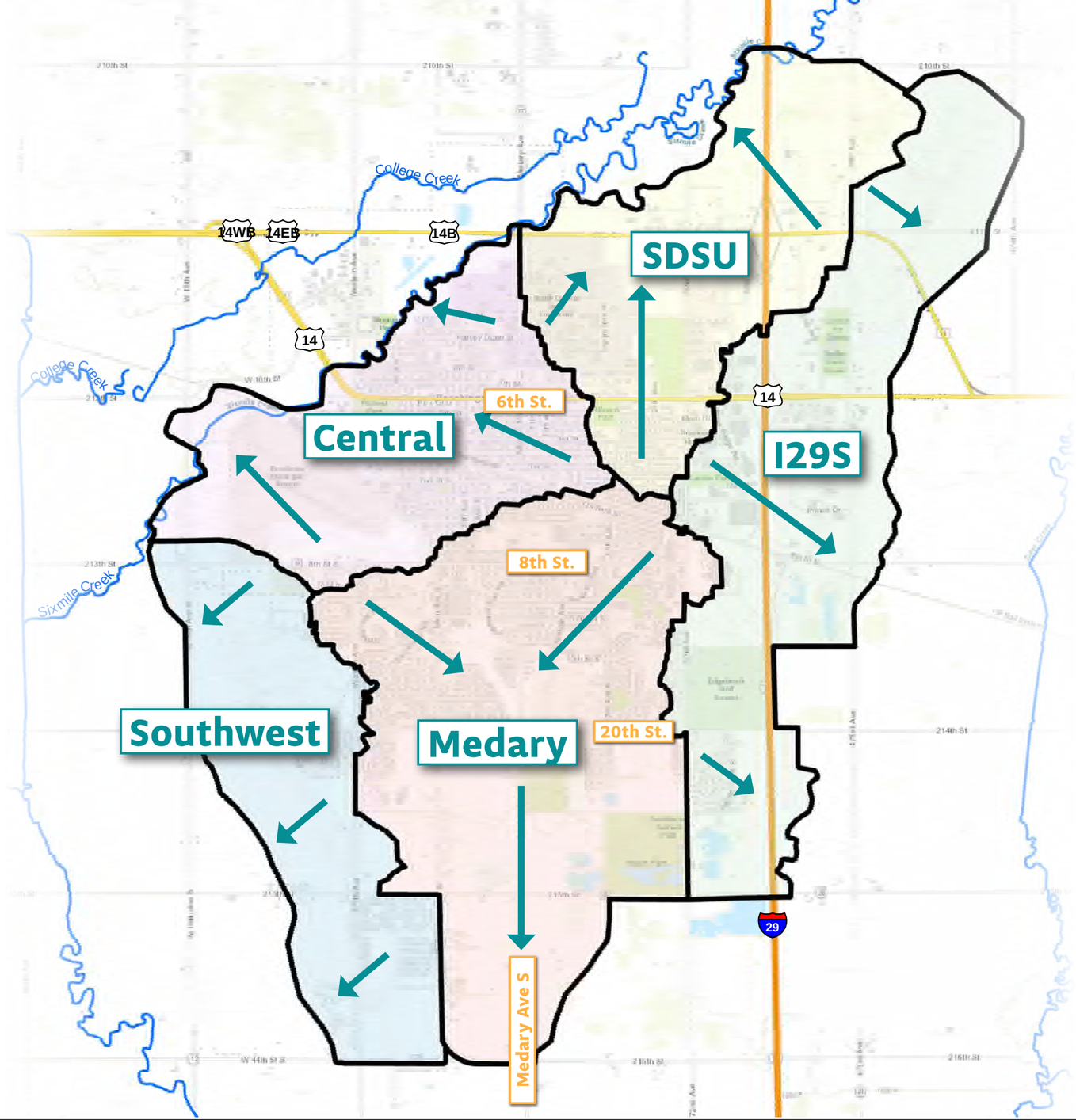
Existing Conditions

Drainage Areas

Key

← Flow Direction

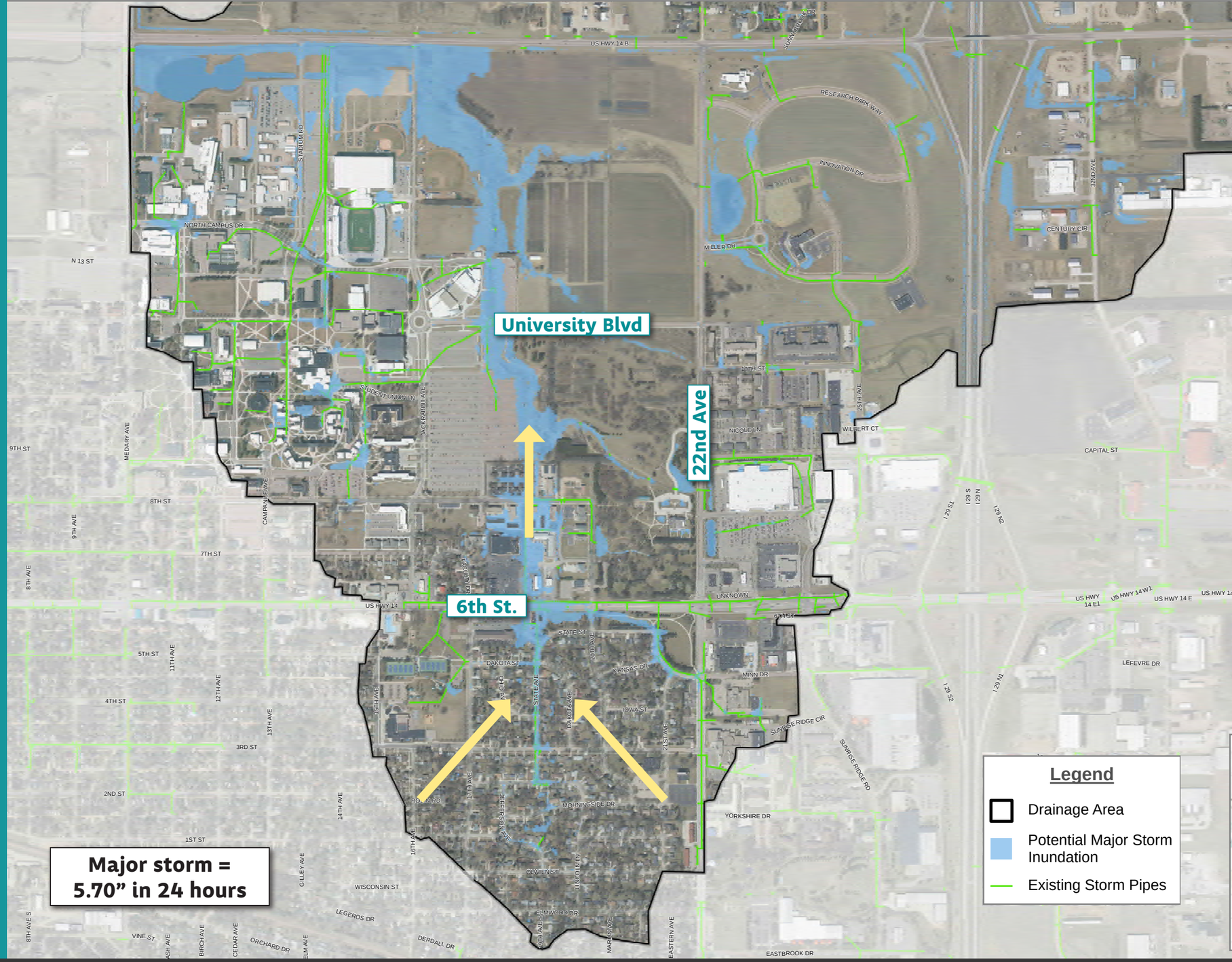
For analysis, the City was broken down into 5 drainage areas



SDSU Drainage Area

Existing Conditions

100 Year Storm Event



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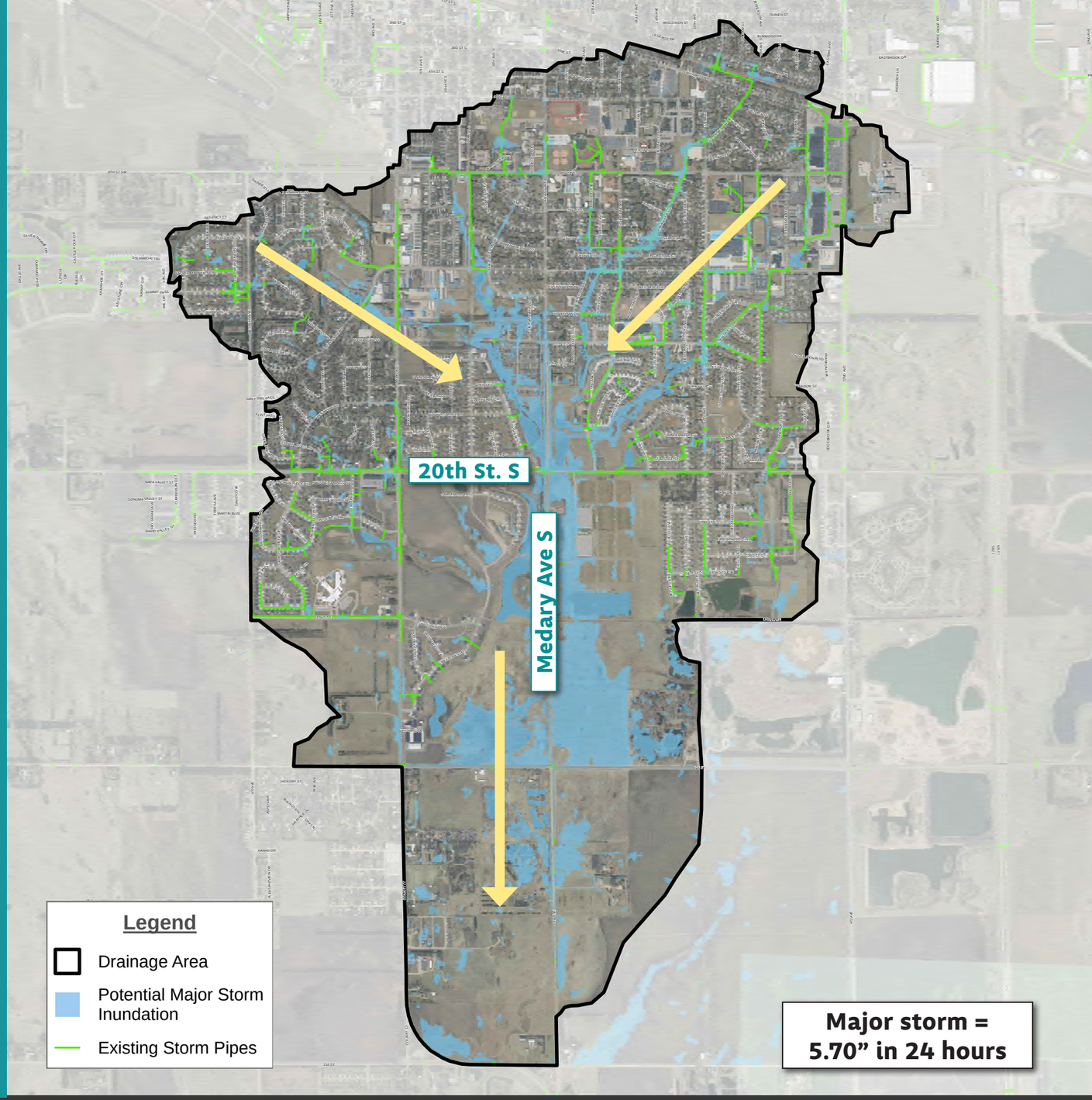
Medary Drainage Area

Existing Conditions

100 Year Storm Event



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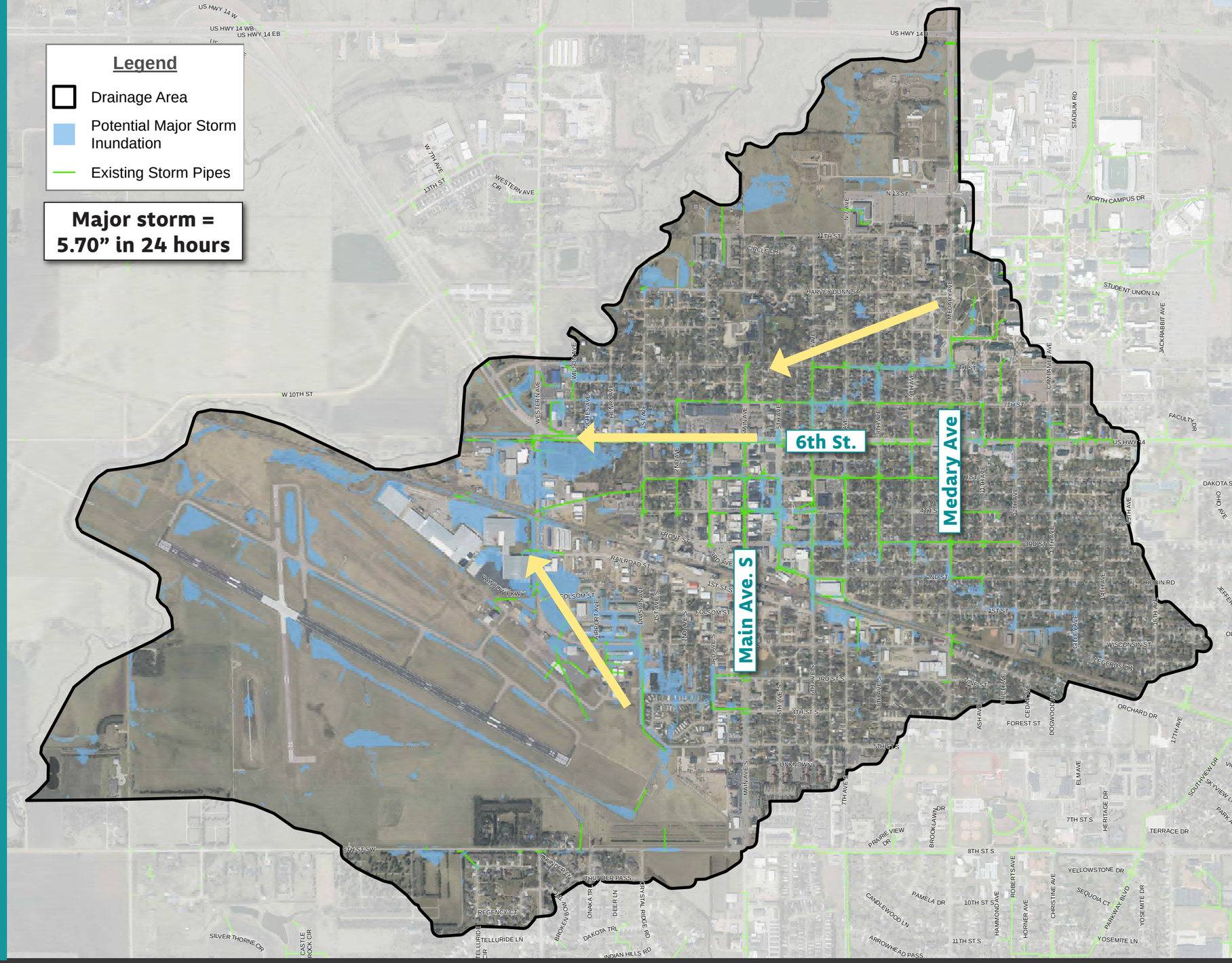
Central Drainage Area

Existing Conditions

100 Year Storm Event



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Community Engagement

- Multiple public engagement events
- Committee meetings
    - City, SDSU, BMU officials, and community reps
- Online survey

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Project Prioritization

Stormwater Project Prioritization Categories

Current Categories

Highest Weight

- Citizen Safety
- Cost vs. Budget
- Occupant Evacuation*
- Location in Basin
- Number of Buildings Affected*
- Traffic Impact*
- Property Affected*
- Infrastructure Age*
- Environmental Impact*
- Reduced Maintenance Issue

Lowest Weight

Recommended Categories

Highest Weight

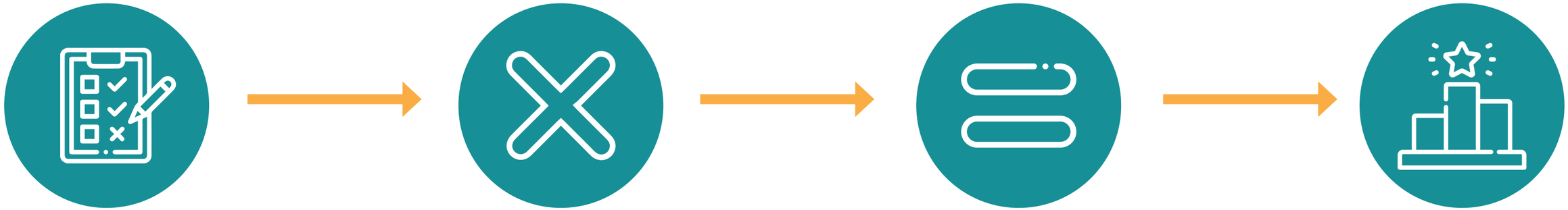
- Citizen Safety
- Protection of Critical Infrastructure*
- Protection of Other Habitable Structures*
- Location in Basin
- Multi-Use+
- Environmental Impact*
- Cost vs. Budget
- Infrastructure Condition*
- Reduced Maintenance

Lowest Weight

** Redefined Categories*
+ New Category

Project Prioritization Process

Re-evaluation of Current System



Assign a score for each category

Multiply each score by that category's weight

Add the individual scores to get the total score

Rank the projects in order of total score

Recommended Projects

Project Identification Strategy

Provide storage upstream of or at location of flooding

Increase conveyance in area of flooding

Provide storage downstream of areas with increased conveyance

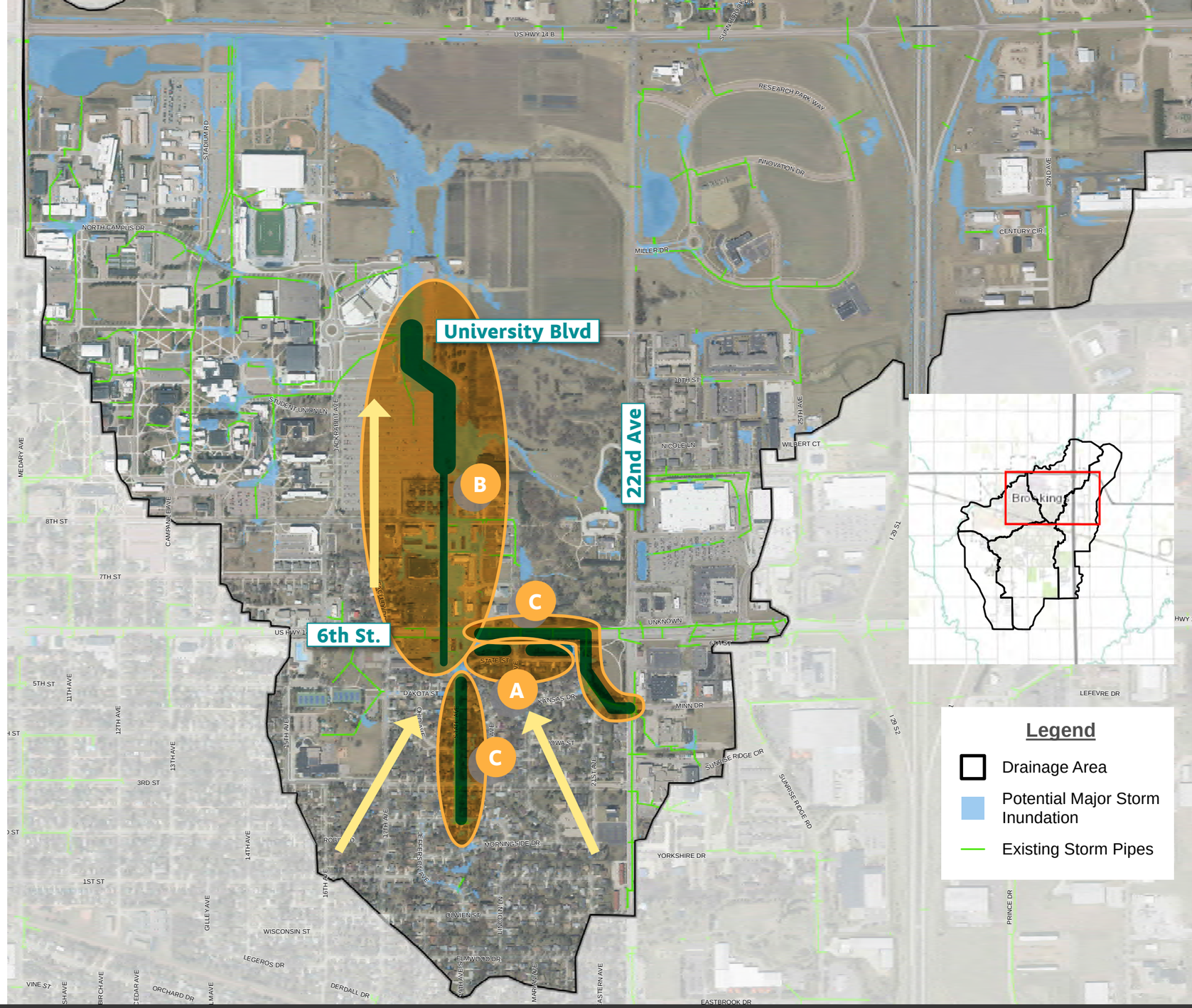
SDSU Drainage Area

A **Rotary Park Improvements**

B **Village Square Conveyance + Storage Improvements**

C **State Avenue + Highway 14 Storm Sewer Improvements**

Note: Projects are not listed in order of priority



Medary Drainage Area

A 8th Street South Storage

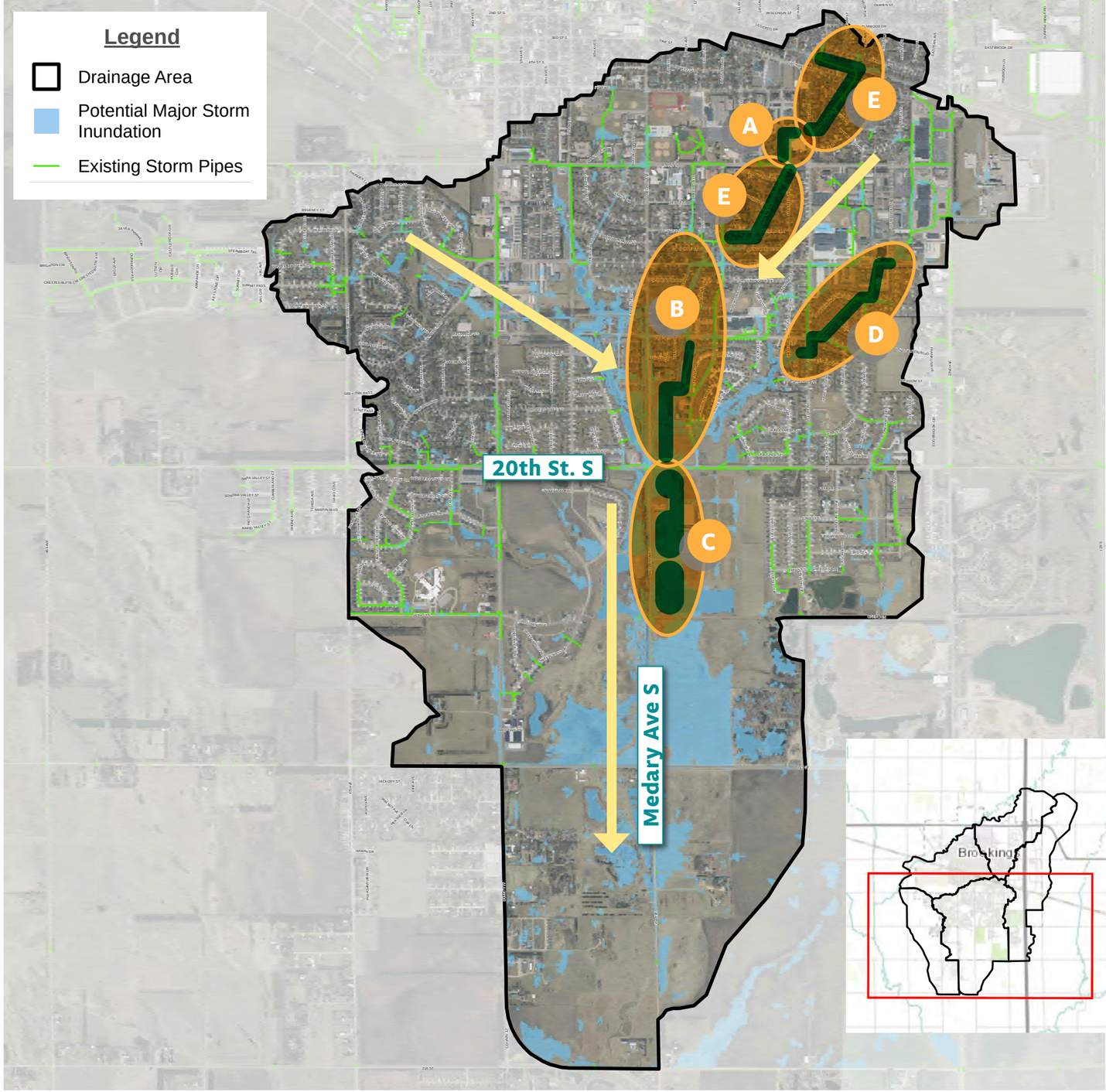
B Nelson Storage + Conveyance Improvements

C 32nd Street Storage + Upstream Conveyance Improvements

D Sawgrass Drive Storm Sewer Improvements

E Parkway Boulevard Storm Sewer Improvements

Note: Projects are not listed in order of priority



Central Drainage Area

A Brookings Regional Airport Storage

B Pioneer Park Improvements

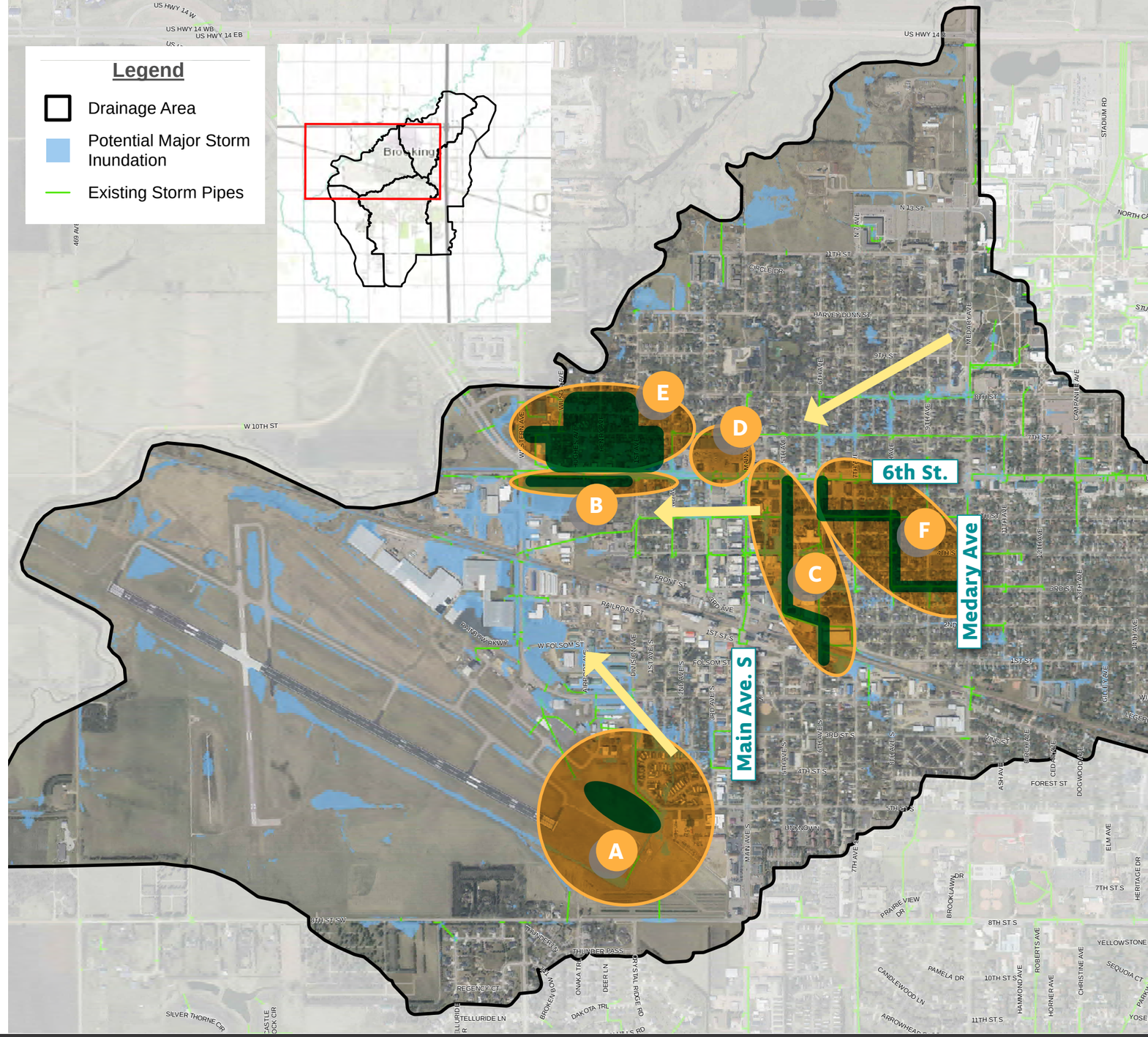
C 5th Avenue Underground Storage + Storm Sewer Improvements

D 6th Street Underground Storage

E Veterans Memorial Park + Storm Sewer Improvements

F 3rd Street Storm Sewer Improvements

Note: Projects are not listed in order of priority



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Projects

Plan Projections

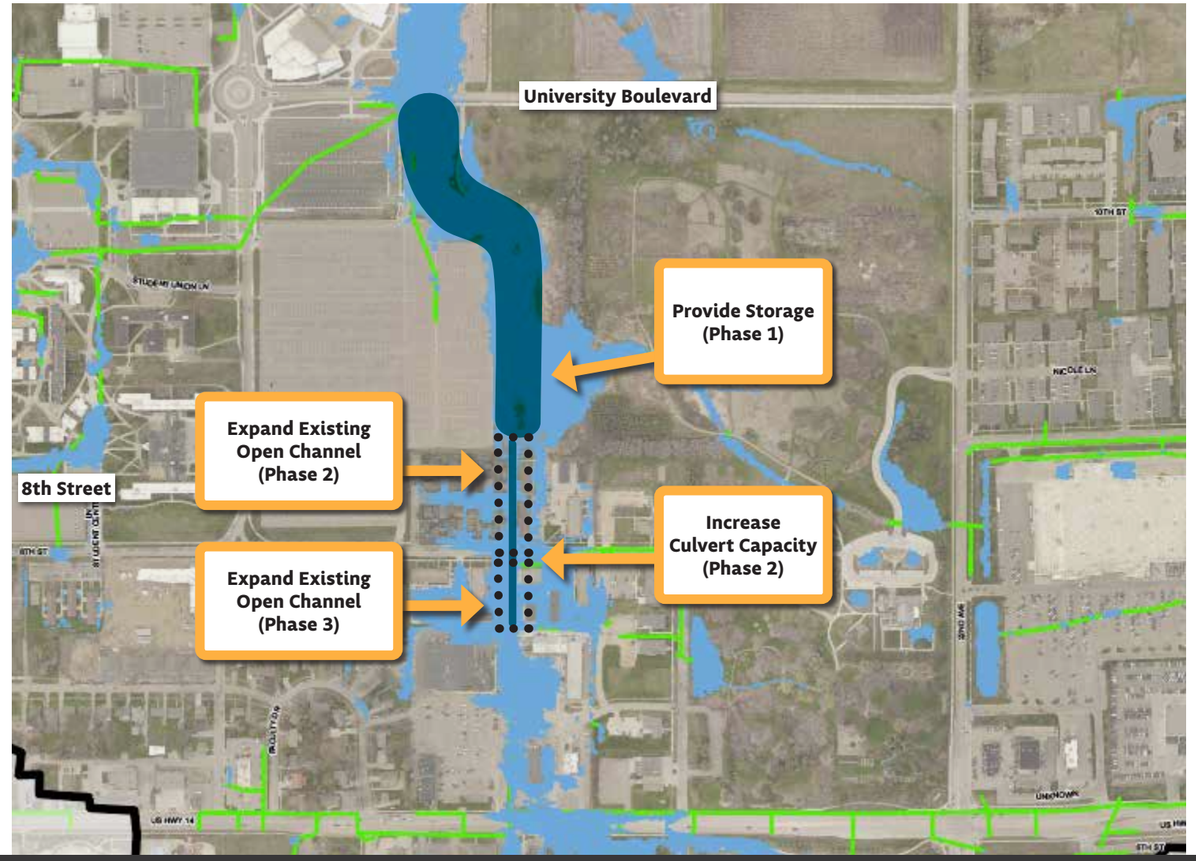
- $12 million dollars worth of projects in the next 10 years with ERU
- In the next 10 years, project construction costs range from $380,000 to $4,700,000
- $45 million dollars in projects identified in plan

Capital Project Name	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	Projected									
Green Infrastructure in Streets	10,816	11,249	11,699	12,167	12,653	13,159	13,686	14,233	14,802	15,395
Neighborhood Improvements	180,627	187,852	195,366	203,181	211,308	219,761	228,551	237,693	247,201	257,089
32nd St. (Medary Ave. / 20th St.) Detention - Phase I (Design)	541,882	-	-	-	-	-	-	-	-	-
32nd St. (Medary Ave. / 20th St.) Detention - Phase I (Construction)	-	-	4,696,514	-	-	-	-	-	-	-
Village Square Conveyance Improvements - Phase I (Design)	-	224,973	-	-	-	-	-	-	-	-
Village Square Conveyance Improvements - Phase I (Construction)	-	-	1,345,337	-	-	-	-	-	-	-
Village Square Conveyance Improvements - Phase III (Design)	61,219	-	-	-	-	-	-	-	-	-
Village Square Conveyance Improvements - Phase III (Construction)	-	381,835	-	-	-	-	-	-	-	-
5th Avenue Underground Storage - Phase 1 (Design)	-	-	-	-	-	-	-	-	222,037	-
Veterans Memorial Park + Storm Networks Improvements - Design	-	-	-	-	-	164,491	-	-	-	-
Veterans Memorial Park + Storm Networks Improvements - Construction	-	-	-	-	-	-	2,024,114	-	-	-
Total Capital Projects	**794,543**	**805,909**	**6,248,917**	**215,348**	**223,961**	**397,411**	**2,266,351**	**251,926**	**484,040**	**272,484**

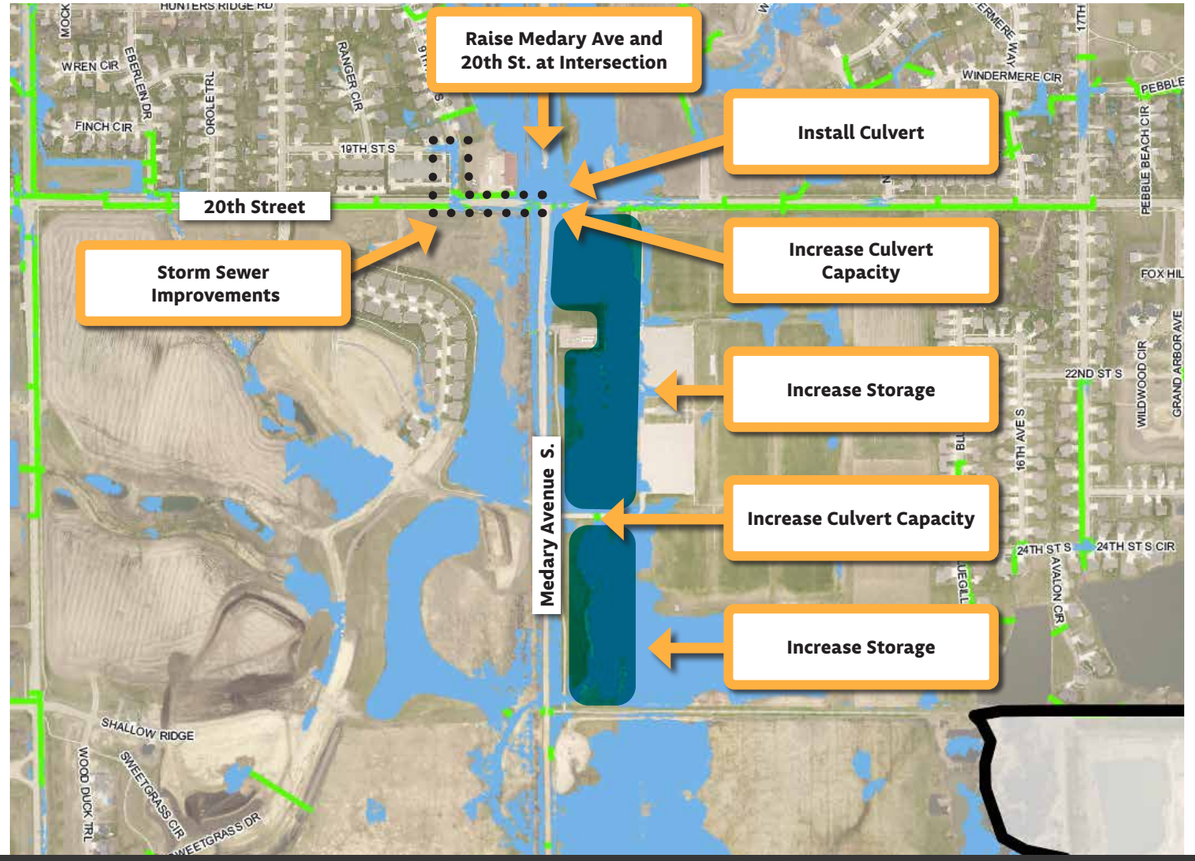
Upcoming Projects

Based on new project prioritization

Village Square Conveyance and Storage



20th Street and Medary Ave Conveyance and Storage

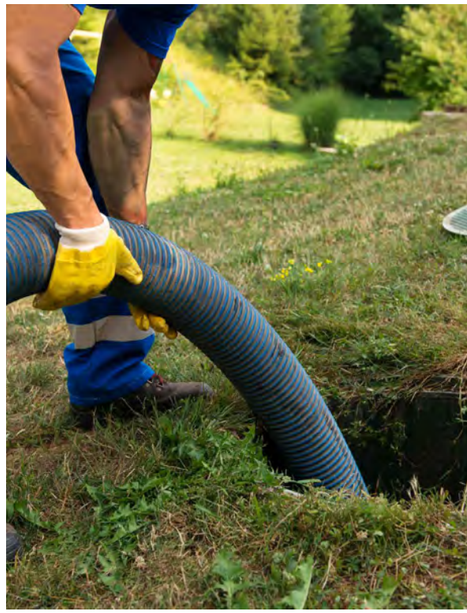


Stormwater Fee

Stormwater Utility Fee

What does it pay for?

- Maintenance of drainage infrastructure, such as pipes, street inlets, drainage swales, and basins
- Replacement of aging infrastructure and new projects that reduce flooding and improve water quality
- Personnel/Administration
- Maintenance of stormwater equipment



Stormwater Fee

Current: Based On Land Use and Area

Stormwater Fee = (Runoff Weighting Factor) x (Parcel Area Square Feet) x (Unit Financial Charge $/Square Feet)

LAND USE	RUNOFF WEIGHTING FACTOR
Cropland, public parks and golf course	1.00
Estate (single-family on 30,000 square feet or more)	2.50
Highway and street right-of-way and airport	5.00
Single-family home and townhouses	7.50
Apartment buildings, mobile homes, dormitories, and education	11.25
Industrial	17.00
Commercial	18.75

Recommended: Equivalent Residential Unit (ERU)

- Fee based on impervious square footage
  - Infrared technology allows calculation of imperviousness on each lot
- Equity
  - Greater imperviousness equals higher runoff and Infrastructure need
- Best Practice
  - 80% of communities in the U.S. with a stormwater fee use an ERU system

Pervious vs. Impervious

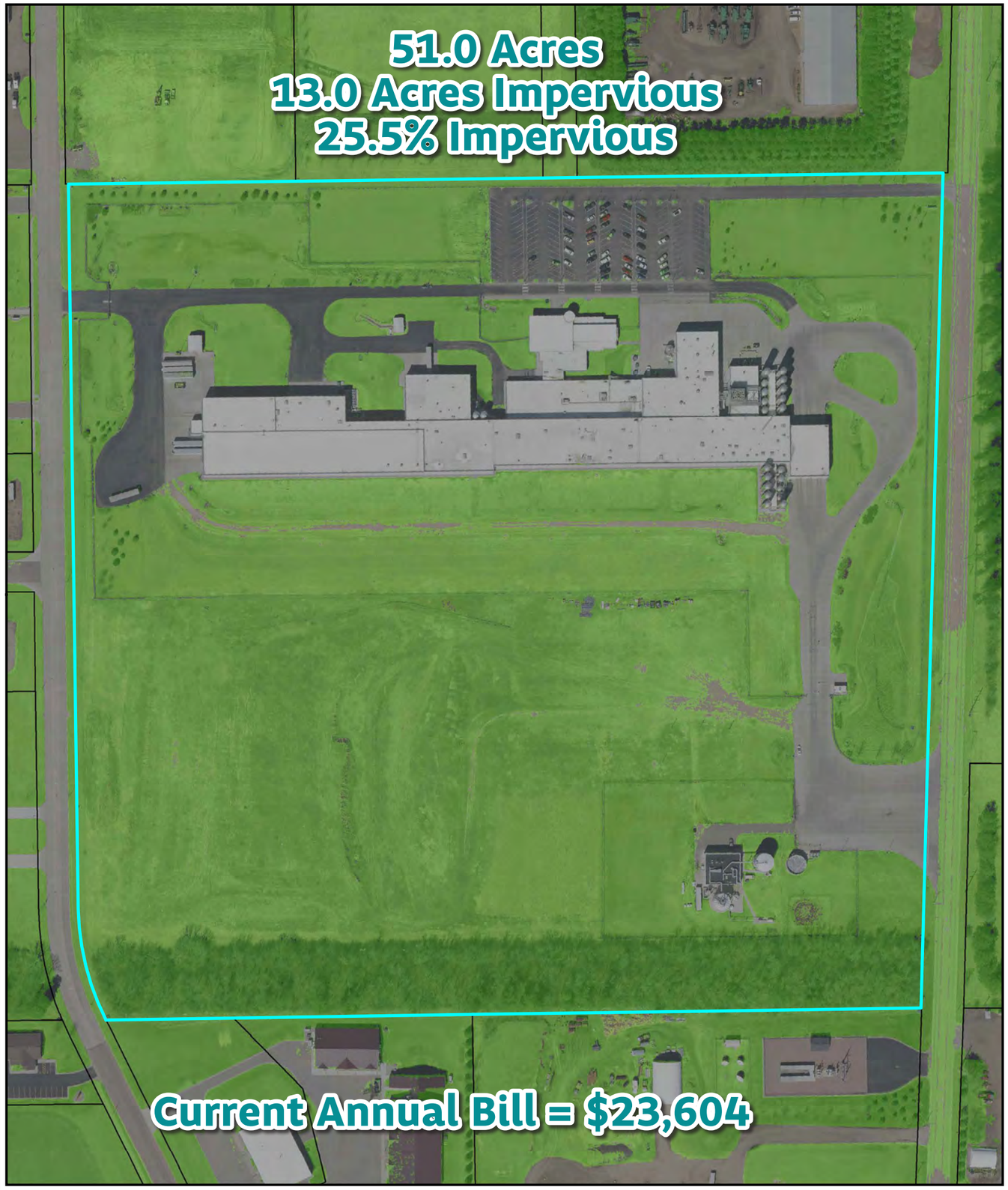
Results From Infrared Flyover

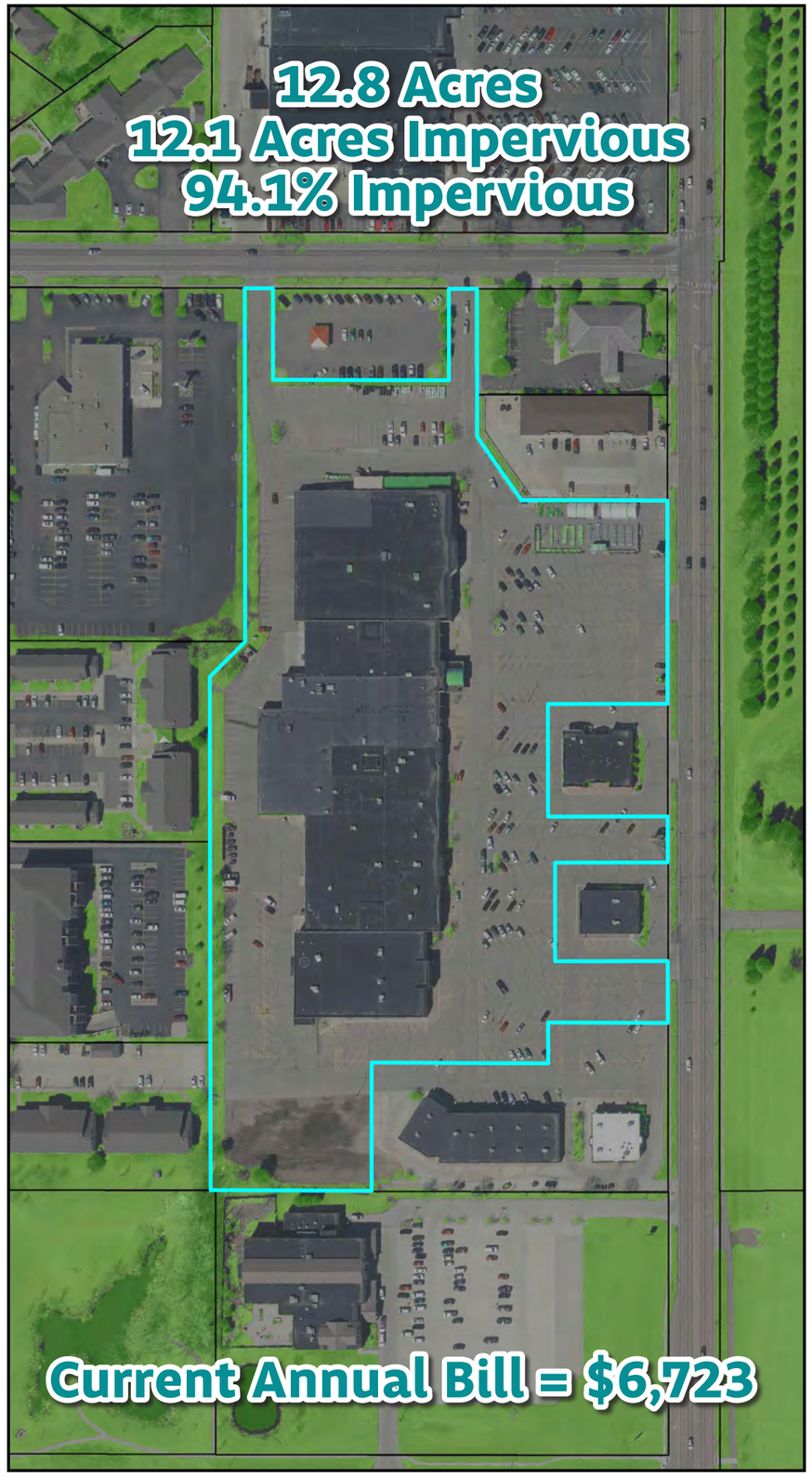
WESTMINSTER DR
BRECKENRIDGE LN
BRECKENRIDGE CIR
17TH AVE S
CAMELOT DR
TORREY PINES DR
SAWGRASS DR
SAWGRASS CIR
SHERIDAN CIR
15TH ST S
SYLVAN CIR

Legend

Classification

- Impervious
- Pervious





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Pervious vs. Impervious Example

Brookings, SD

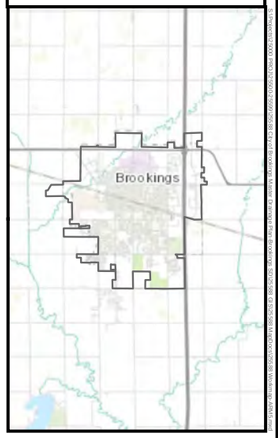
Friday, November 3, 2023

Legend

- Parcels
- Impervious Cover
- Pervious Cover

N

0 100 200 Feet



ERU in Brookings

- Average single-family residential impervious area = 1 ERU = 4,573 square feet
    - Based on infrared flyover
- All single-family residential properties pay 1 ERU
- Non single-family residential property fees depend on the parcel's impervious area

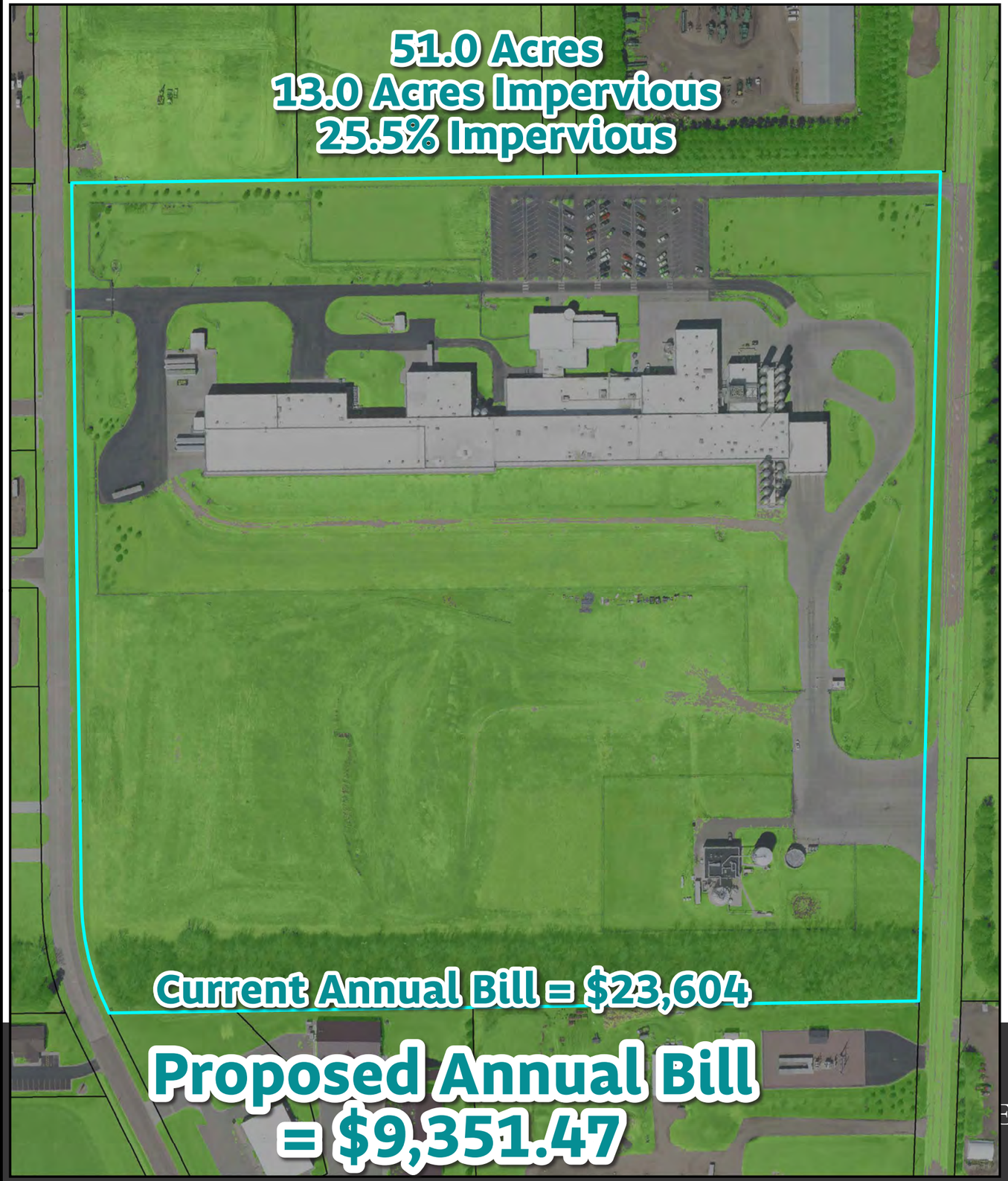
EXAMPLE PARCEL WITH 4,573 SQUARE FEET OF IMPERVIOUS AREA

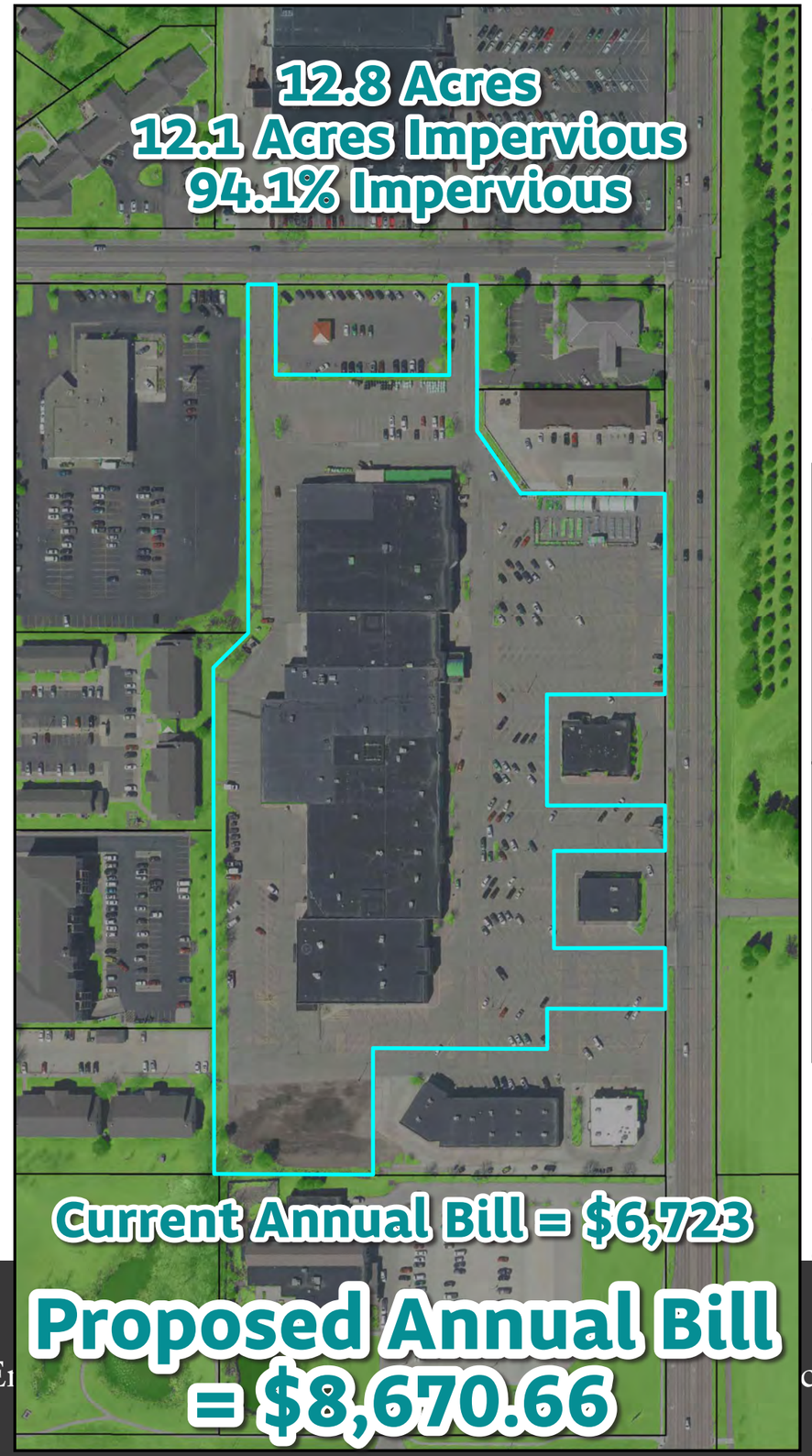
Proposed Stormwater Fee

Proposed ERU

- $6.14/month (effective 2025)
- 4.24% increase to “average” single-family residential property (last increase in 2019)
- 3% annual rate increase (effective 2026)
- Generates approximately extra $300k/yr
    - 37% single family residential
    - 63% other
- Funds $12M of projects over the next 10 years
- Billed with property tax

PEER COMMUNITY	ERU?	$/MONTH FOR SINGLE-FAMILY PROPERTIES	ANNUAL INCREASES?	POPULATION
Sioux Falls, SD	No	~$7.41	Yes, 4%	196,528
Cedar Falls, IA	No	$4.78	Yes, 7%	40,388
Fargo, ND	Similar	$5.00	Periodic increases	126,748
Mankato, MN	Similar	$4.89	Unclear	44,693
Ames, IA	Similar	$5.20	No	66,424
Des Moines, IA	Yes	$15.87	Periodic increases	212,031
Cedar Rapids, IA	Yes	$7.40	Yes, 5%	136,467
Dubuque, IA	Yes	$8.85	Unclear	59,119





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Pervious vs. Impervious Example

Brookings, SD

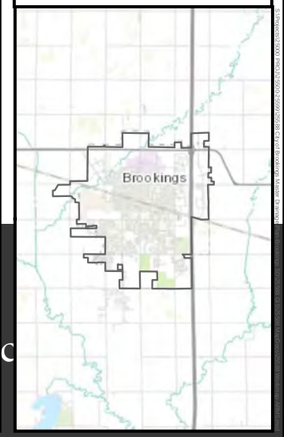
Friday, November 3, 2023

Legend

- Parcels
- Impervious Cover
- Pervious Cover

N

0 100 200 Feet

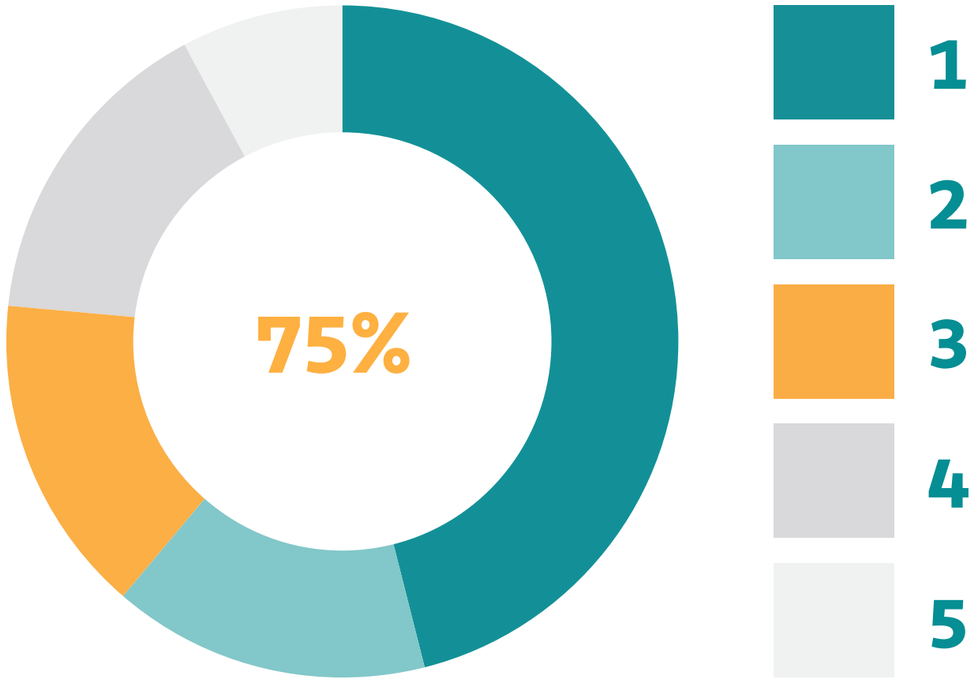


Water Quality

Online Survey Results

How important is it to install practices, such as green infrastructure, native habitat, and greenway corridors that enhance flood resiliency while also improving water quality, recreation, and quality of life?

(One being most important, five being least important)



Implement Water Quality Practices for Residential Properties

Establish Reimbursement Program

- Example: City of Des Moines reimburses 50% of the property owner's cost, up to $2,000

Proposed Eligible Projects

- Rain barrels
- Native plantings

Potential Expansion of Program in Future

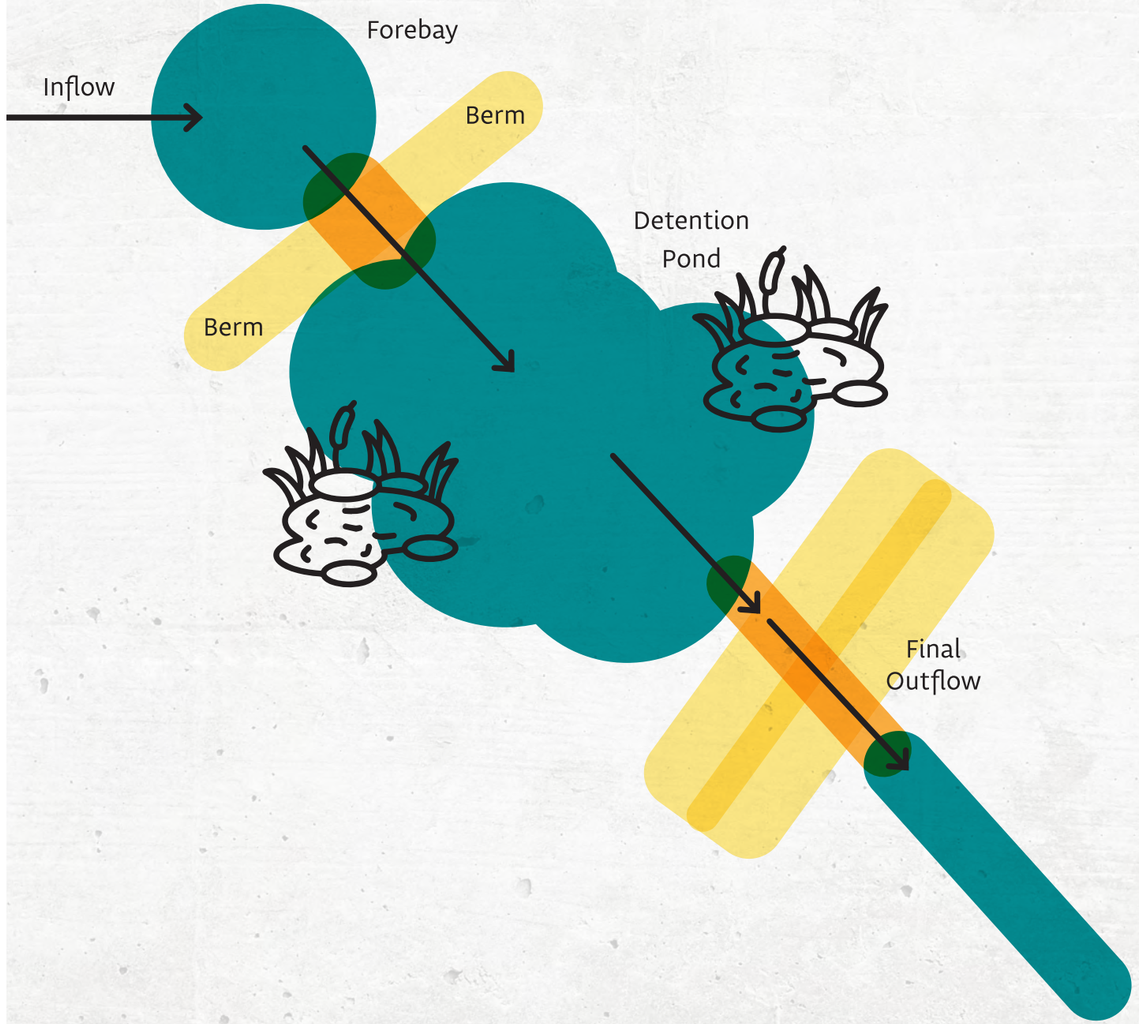
- Rain gardens
- Soil quality restoration
- Permeable pavers

Development Standards and Inspection Procedures

Development Standards

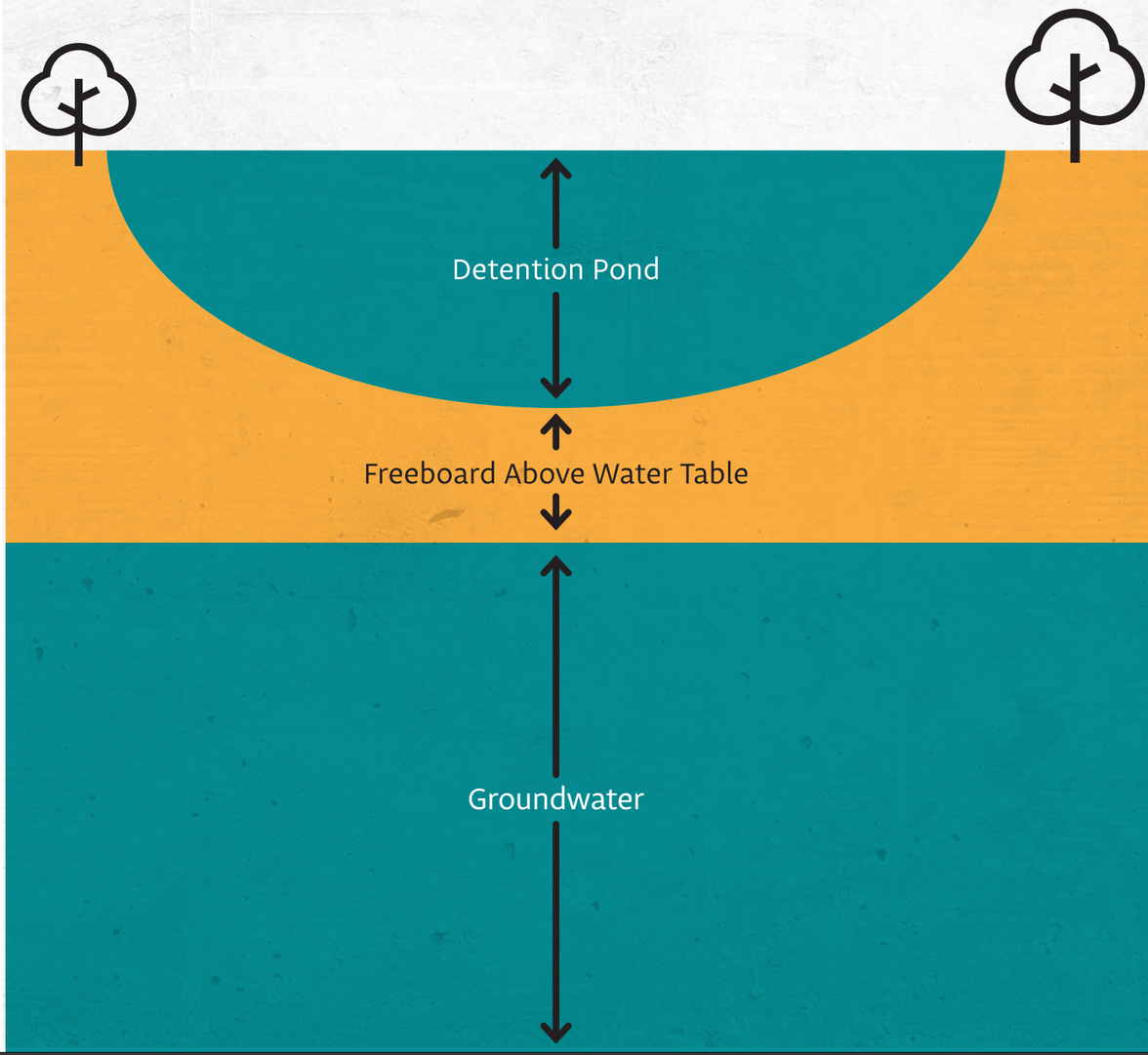
Reference image:
https://megamanual.geosyntec.com/npsmanual/sedimentforebays.aspx

Forebay



Development Standards

Groundwater Freeboard



Inspection Procedures

- Identified City owned critical stormwater infrastructure
- Developed new inspection form
- Inspection frequency
- GIS based


Stormwater Best Management Practices (BMP)
Inspection + Maintenance Report
brookings
CONTACT INFORMATION
Please use one form per BMP.
Property Overview
Address/Location
Construction Year
Primary Point of Contact
Name
Address
Email Address
Phone Number
Inspection Information
Date of Inspection
Last Rainfall
Inspector Name
Inspector Company
Email Address
Phone Number
FOR CITY USE ONLY
The City of Brookings will keep this form on file for property record purposes.
Date Received
City Staff Reviewed
Yes
No
N/A
Reviewed By
Signature
Contact • Name • Email • Phone
Brookings, SD

Summary

Summary

The Plan

- Guiding document for future stormwater improvements and development standards
- Improves resiliency against flood risk
- Provides recommendations to accelerate practices that improve water quality
- Improves sustainability and protection of our watersheds

ERU FEE

- Improves equity
- Ensures funding for $12M in projects for next 10 years

Next Steps

- ISG to compile the final report.
- Present final report to public and City Counsel after the first of the year.
- ERU Fee Ordinance 1st and 2nd readings anticipated by the end of the first quarter of 2024.

Questions?

CITY OF BROOKINGS MASTER DRAINAGE PLAN

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