



**CITY OF
MANDAN**

"WHERE THE WEST BEGINS"

COMMUNITY INFORMATIONAL MEETING

*Veteran's Room
5:00 – 7:00 pm
April 24, 2018*



HoustonEngineering Inc.

STORMWATER MANAGEMENT TEAM



Michael Gunsch,
PE, CFM



Gabe Bladow,
PE



Nic Cullen,
PE, CFM

Collaborating with



**CITY OF
MANDAN**
"WHERE THE WEST BEGINS"



**CITY OF
MANDAN**

"WHERE THE WEST BEGINS"

STORMWATER MANAGEMENT PLAN

***Program Audits / Community Involvement
Watershed Master Plans (3)
Identified Problem Areas (4)
Ordinance and Manual***



HoustonEngineering Inc.

STORMWATER MANAGEMENT PROGRAM



- *MS4 Compliance Audit (2016-2017)*
 - *Community Involvement/Survey*
- *Stormwater Management Plan Audits*
- *Evaluate City Designated Problem Areas*
- *Master Plan Regional Watersheds*
 - *I-94 Watershed (NW Mandan)*
 - *Terra Vallee Watershed (Andeavor)*
 - *Sunset Drive Watershed (Downtown)*
- *Stormwater Ordinance*
- *Stormwater Design Standards Manual*



■ MS4 Audits

- *Past performance and adherence to EPA/NDDH stormwater regulations 2016 MS4 Annual Report*
- *Construction site observation and erosion control compliance (Best Management Practices – BMP's)*

■ SWMP Audits

- *Technical review of submitted Stormwater Management Plans (SWMP), for compliance with City ordinance and design manual, consistent quality control*

Recommendations to improve functionality, efficiency and assure compliance



Erosion and Sediment Control Permits (ESCP)



- *Reviewing previous actions allows the City to improve on program compliance*

- *Program enhancements for regulatory compliance and asset management – software and staffing requirements.*



EXISTING STORM WATER SYSTEMS



- ***Evaluate City identified problem areas:***
 - ***Memorial Park Flooding ****
 - ***Terra Vallee/Andeavor***
 - ***Sunset Drive (5th Avenue NW)***
 - ***Downtown (Main, 1st & 2nd St) ****

- ***Determine Solutions***

- ***Alternative Recommendations***





■ *Watershed Master Plans*

- *Watershed size and expected nature of future development*
 - *Zoning projections, runoff projections and future roadways*
- *Evaluate upstream and downstream hydraulic impacts*
- *Locate and size “regional facilities”*
- *Recommended stormwater management measures*

More Later...





"WHERE THE WEST BEGINS"

Input requested on stormwater management

Consultants assisting the City of Mandan Engineering and Planning Department with a stormwater management plan are seeking community input on stormwater management issues. This is more than inlets and storm sewers in the

street. It includes controlling street and surface water flows, creating detention areas and green space to regulated water, as well as implementing and enforcing stormwater quality control and treatment, all to prevent undesirable impacts. As development expands to higher elevations to the north and west, management of storm water runoff is becoming even more prudent. An online survey at www.surveymonkey.com/r/MandanStormwaterSurvey will be open through Nov. 30. If you have questions, please contact project manager Michael Gunsch at 701-751-6277 or mgunsch@houstoneng.com.

City Contacts

Mandan City Hall
205 Second Avenue NW
Phone 701-667-3215
Fax 701-667-3223
www.cityofmandan.com

Mandan City Commission

Mayor Tim Helbling
Mike Braun
Scott Davis
Shauna Laber
Dennis Rohr

City Departments

Administration 667-3215
Airport Authority 663-0669
Assessing 667-3232
Building Inspection 667-3230

COMMUNITY SURVEY RESPONSE SUMMARY

Reaching out for your input!

Web Site

Facebook

Email

Messenger

– and here is what you said...

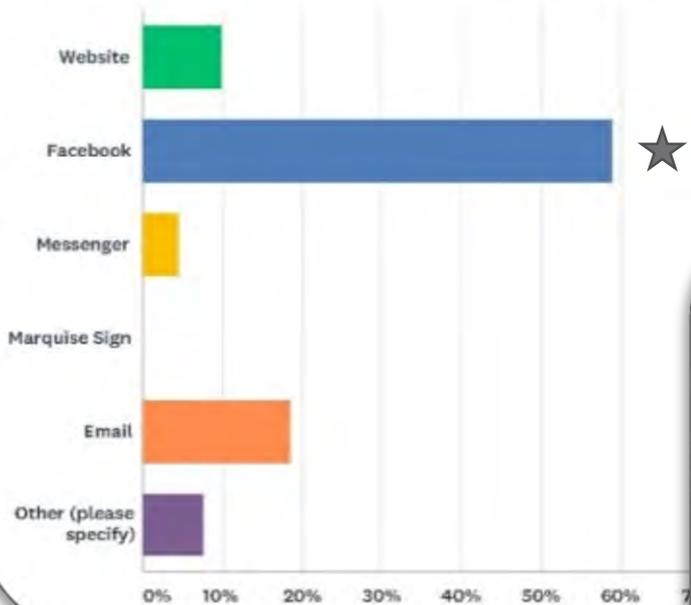


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SURVEY RESPONSES

Q1 How did you hear about the survey?

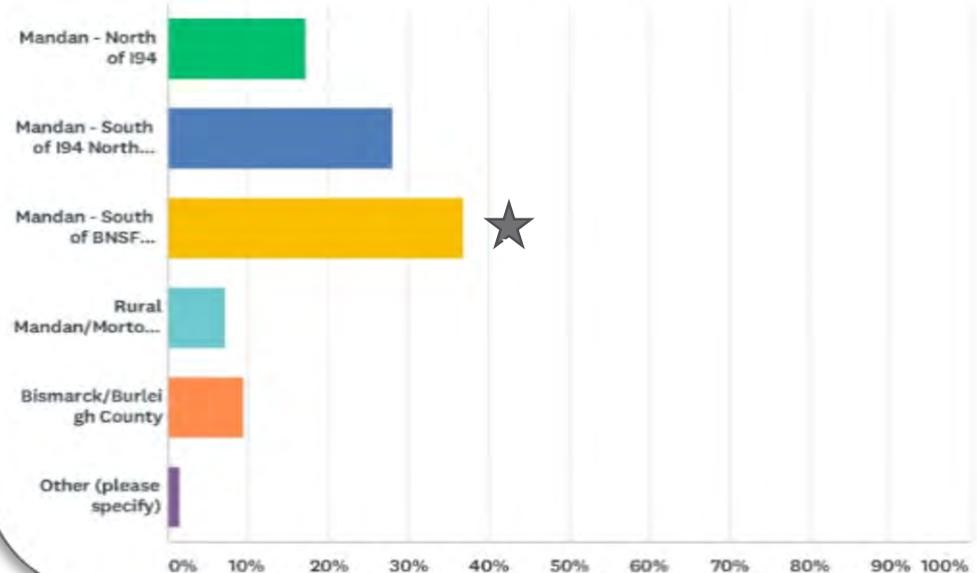
Answered: 129 Skipped: 0



**129 respondents
community wide**

Q2 Where is your residence?

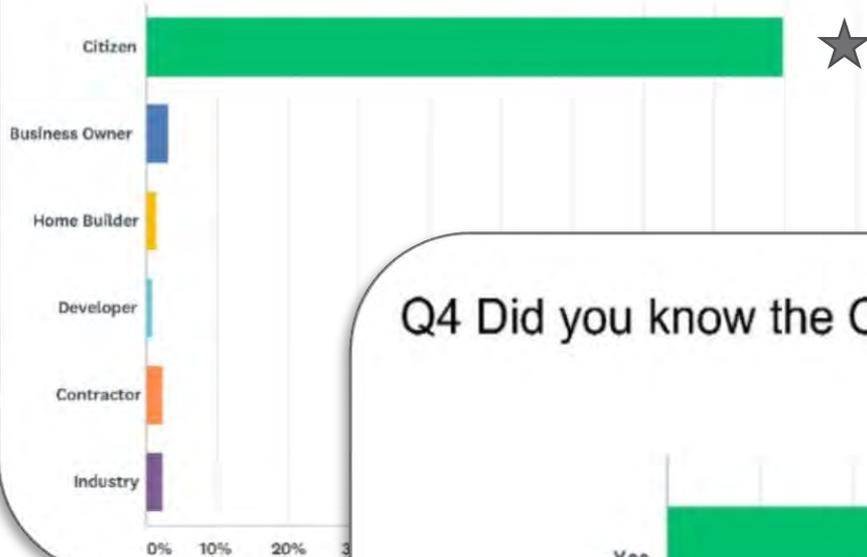
Answered: 128 Skipped: 1



SURVEY RESPONSES

Q3 What best describes you? (check one)

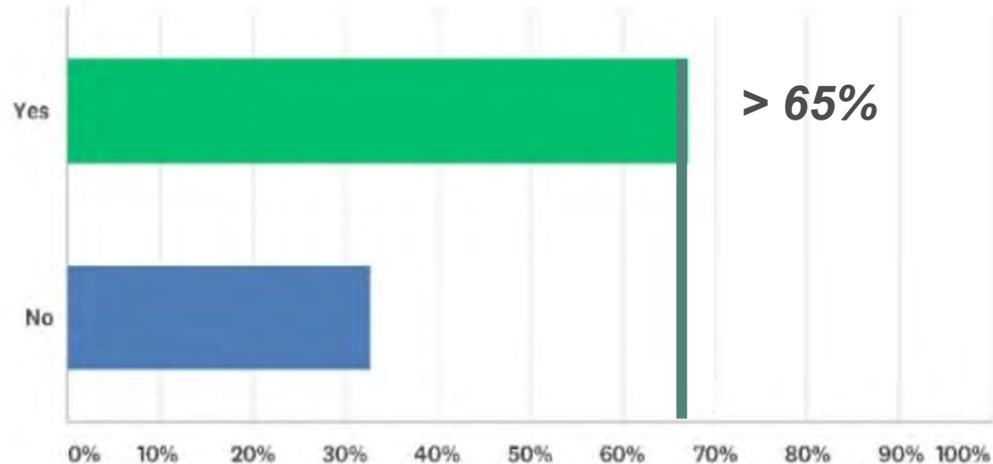
Answered: 128 Skipped: 1



Citizen Focused Responses

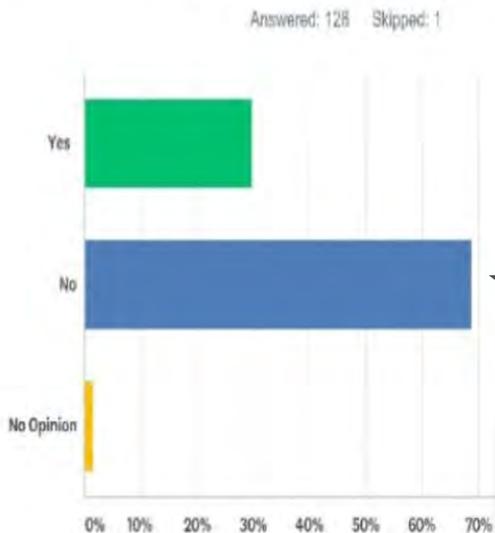
Q4 Did you know the City of Mandan regulates stormwater runoff?

Answered: 128 Skipped: 1



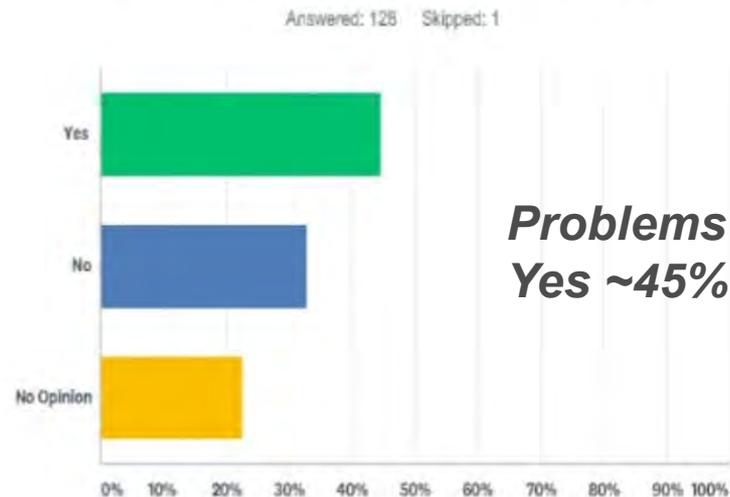
SURVEY RESPONSES

Q5 Are you aware of the City's stormwater regulations and requirements?



**Nearly 70%
Unaware of Regulations?
Education Component of MS4**

Q6 Do you think the City has a problem with the quality of stormwater runoff generated by our community?

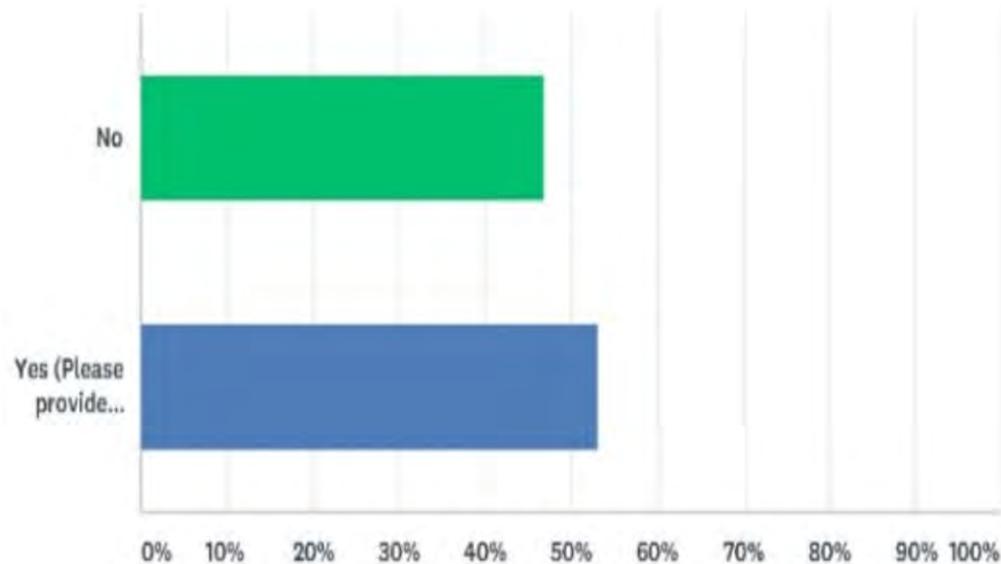


**Problems Exist
Yes ~45%**

SURVEY RESPONSES

Q7 Are you aware of areas within the City that frequently flood from rainfall (stormwater) or snowmelt runoff?

Answered: 128 Skipped: 1

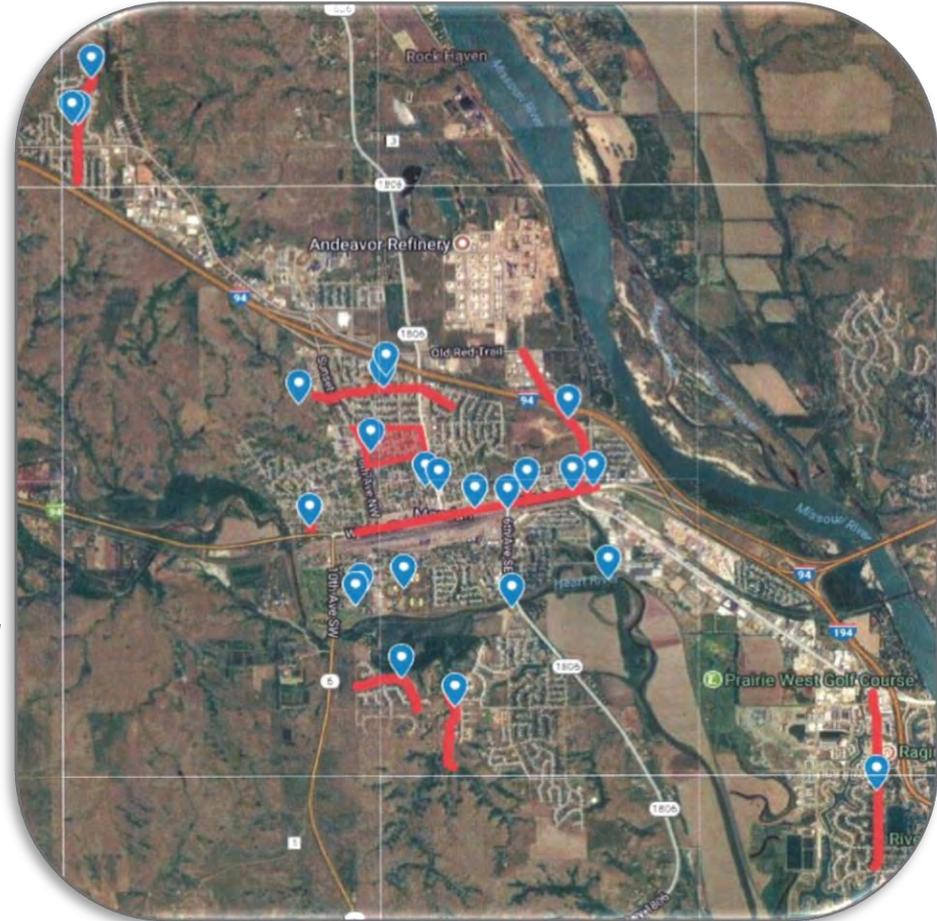


This question yielded numerous Citizen responses

CITIZEN IDENTIFIED PROBLEM SITES



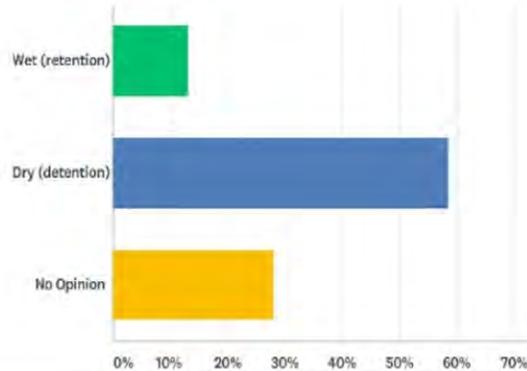
1. Canyon Rd (2)
2. Dog Park
3. Baseball Fields
4. Ferris Field (2)
5. Heart River Spillway
6. 12th Ave NW (2)
7. 1st Ave NW and 3rd St NW
8. Post Office
9. 6th Ave SE
10. 9th Ave NE (2)
11. 46th Ave SE (2)
12. Mandan Ave (2)
13. Division St, Collins Ave, Sunset Dr.
14. 14th St NW (2)
15. 37th Ave NW (3)
16. Red Trail School
17. Coulee (2)
18. Hillside Park
19. East and West Main Avenue (3)
20. Burger King
21. 16th St NW and 3rd Ave NW



SURVEY RESPONSES

Q8 There are several types of stormwater storage, one retains water and is wet and is wet for most of the season (retention), while the other is normally dry and temporarily retains stormwater runoff (detention). Do you prefer one type over the other?

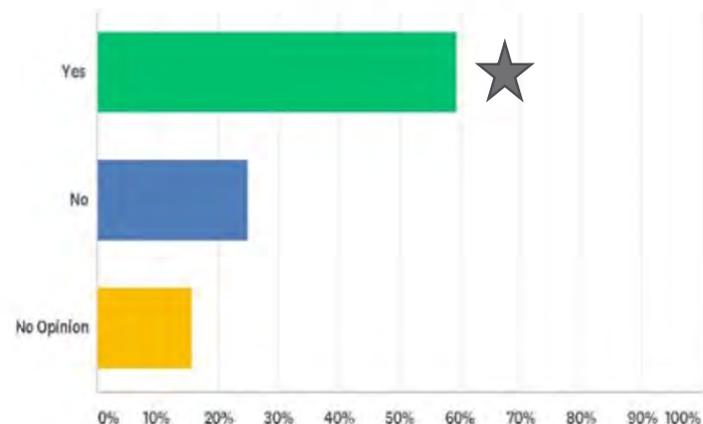
Answered: 128 Skipped: 1



**Regional or Local
Detention Storage
“Dry Preferred”**

Q9 If a large drainage (watershed) area creates flooding downstream is it reasonable for everyone located within the drainage (watershed) area to participate in funding a solution?

Answered: 128 Skipped: 1

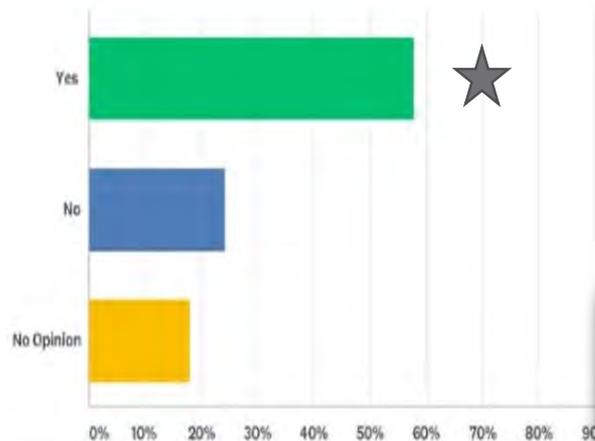


Equitable Participation

SURVEY RESPONSES

Q10 Is it reasonable to ask paved (impervious) areas to contribute more toward a solution to runoff problems than is asked of grass covered (pervious) areas based on the runoff they generate?

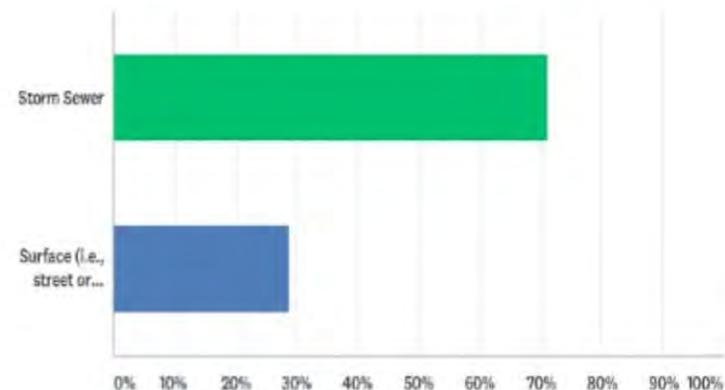
Answered: 128 Skipped: 1



Special Assessment equity cost distribution ratio

Q11 Stormwater runoff to be drained from one location to another typically is conveyed through storm sewers or on the surface (i.e., street or channel), what is your preference on how it is conveyed?

Answered: 125 Skipped: 4

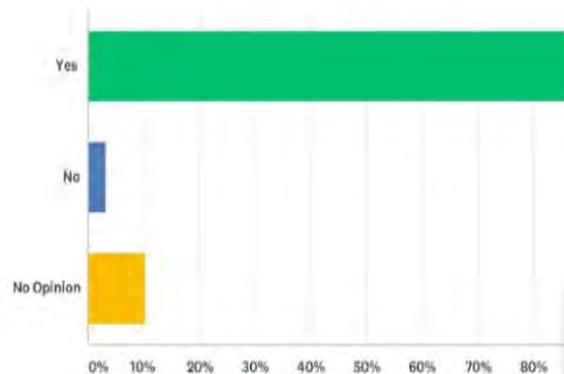


***Storm Sewer is preferred
Design is based on economics***

SURVEY RESPONSES

Q12 If areas outside the City contribute stormwater runoff into areas inside the City, should these areas contribute funds to pay for handling of these waters when they annex into the City?

Answered: 128 Skipped: 1

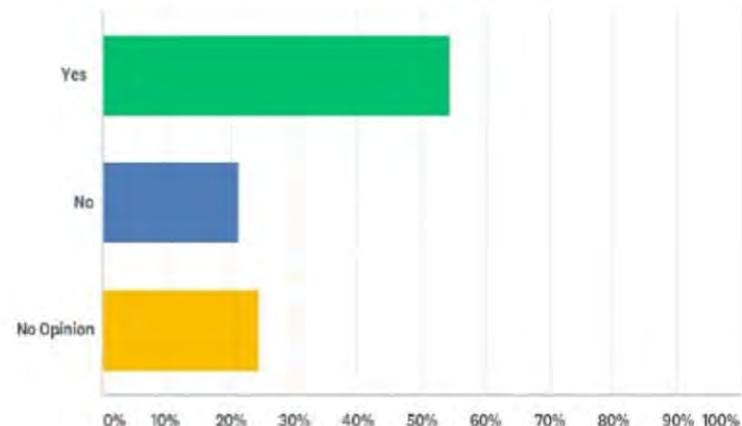


Broad support for watershed contribution and shared costs

***Erosion Control Measures
(BMP's)
Perception is, they work***

Q13 Do you find silt fences, bio-logs, earthen berms and other landscaping efforts (BMP's=Best Management Practices) are working to reduce soil erosion from construction sites?

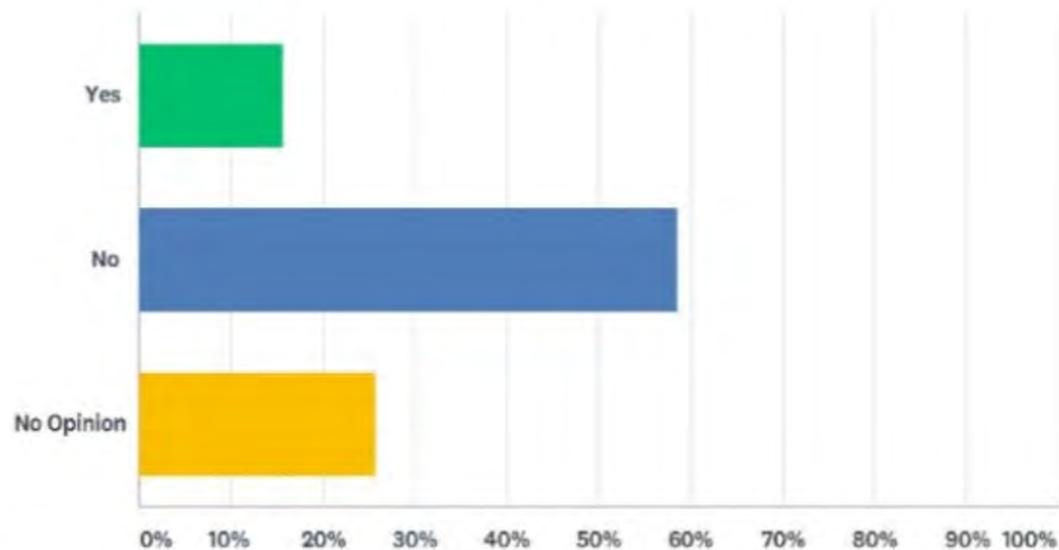
Answered: 127 Skipped: 2



SURVEY RESPONSES

Q14 Do you believe Contractors/Developers in Mandan are over regulated when it comes to stormwater runoff and development of their property?

Answered: 128 Skipped: 1

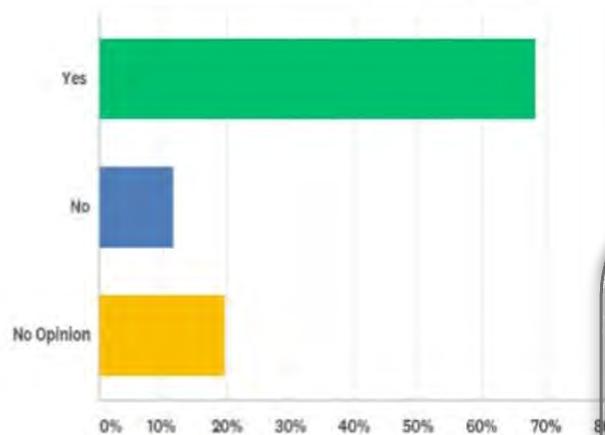


Regulatory compliance can be improved

SURVEY RESPONSES

Q15 Do you think the City should consider creating more regional stormwater storage facilities that may incorporate parks and green space?

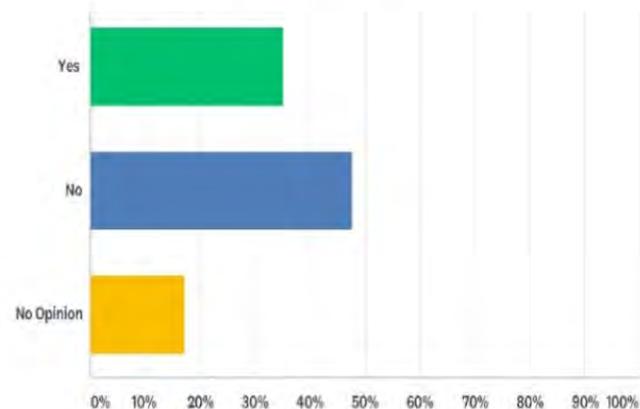
Answered: 127 Skipped: 2



***Support for Regional Facilities
Green Space and Parks***

Q16 Do you believe that special assessments should be used to fund and install regional stormwater storage facilities that benefit larger watersheds?

Answered: 128 Skipped: 1

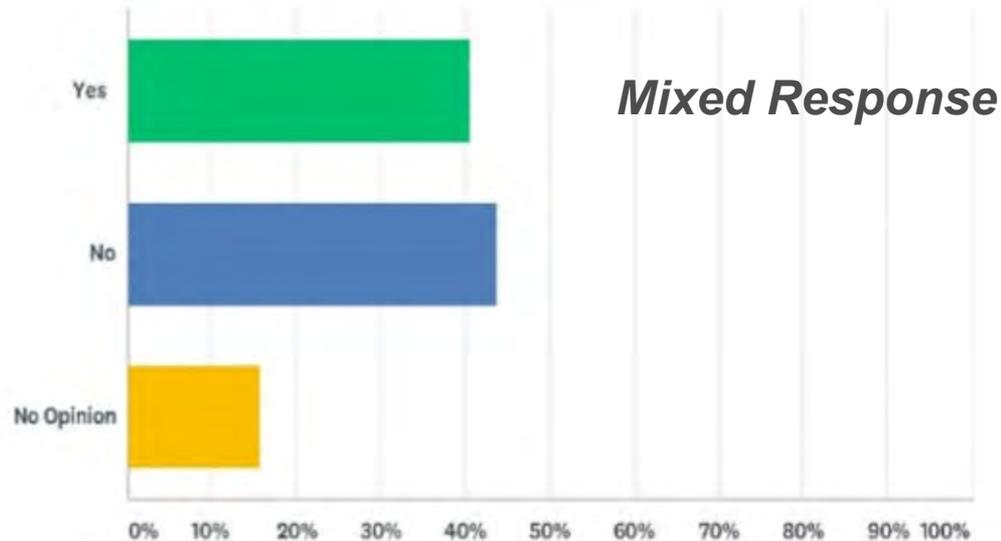


***Some aversion to
Special Assessments***

SURVEY RESPONSES

Q17 The City currently charges a stormwater fee of \$2.00 on your water bill for system maintenance. Would you be willing to pay more if the City would use these funds to enhance its stormwater management and permit program?

Answered: 128 Skipped: 1

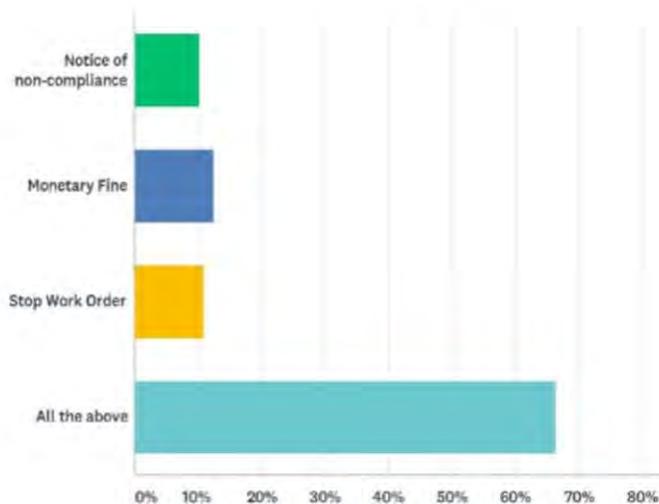


Fiscal Considerations

SURVEY RESPONSES

Q18 If a Contractor/Developer fails to maintain erosion control requirements on their construction site, which of the following do you think should occur?

Answered: 128 Skipped: 1

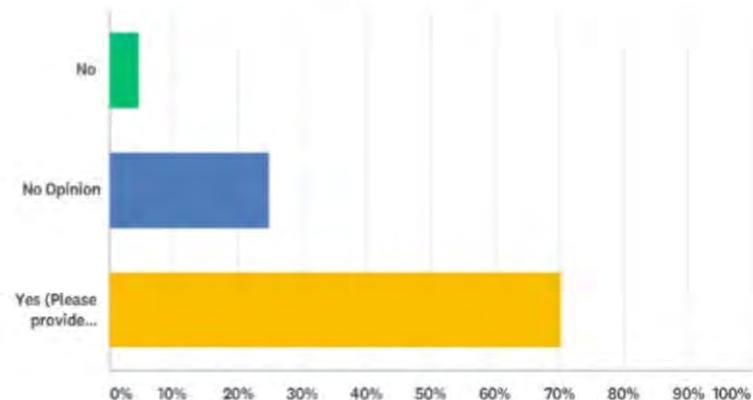


**Means to achieve compliance
All the above!**

***Citizens want the ability
to provided input and expect
accountability***

Q19 Do you believe there should be a method for Citizens to report stormwater discharge violations or problems?

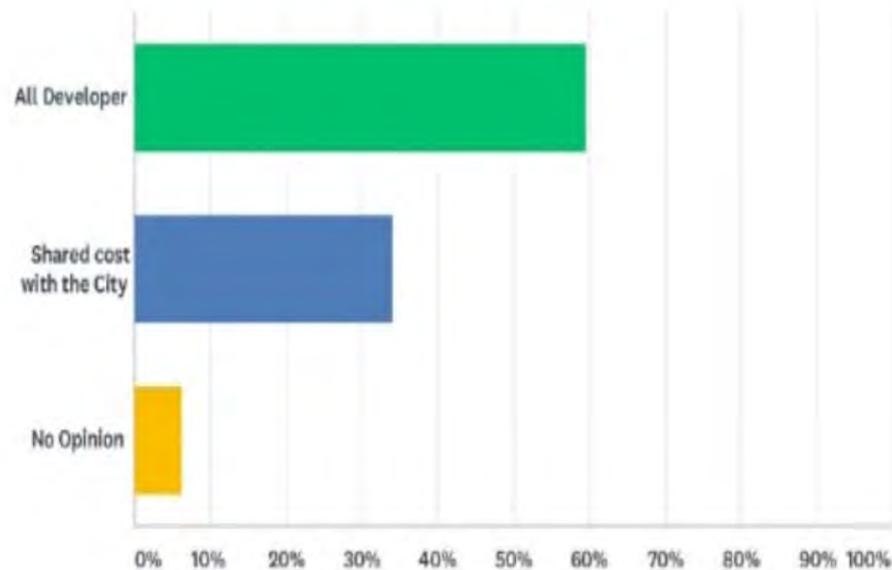
Answered: 128 Skipped: 1



SURVEY RESPONSES

Q20 New developments must submit Stormwater Management Plans and Stormwater Permits as they develop. Should the developer pay to cover the review cost or is some of this a City obligation?

Answered: 126 Skipped: 3

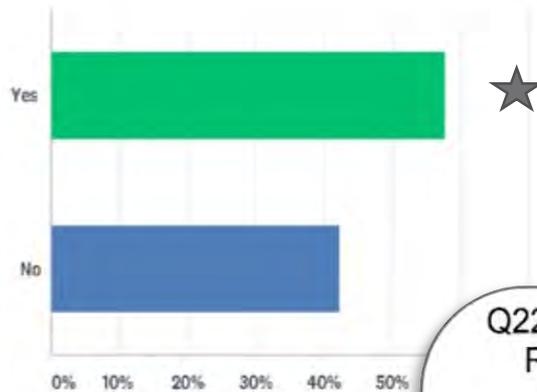


Community vs Developer Expense

SURVEY RESPONSES

Q21 Are you aware of the Lower Heart River Flood Control Project and the protection it provides to the City of Mandan?

Answered: 128 Skipped: 1

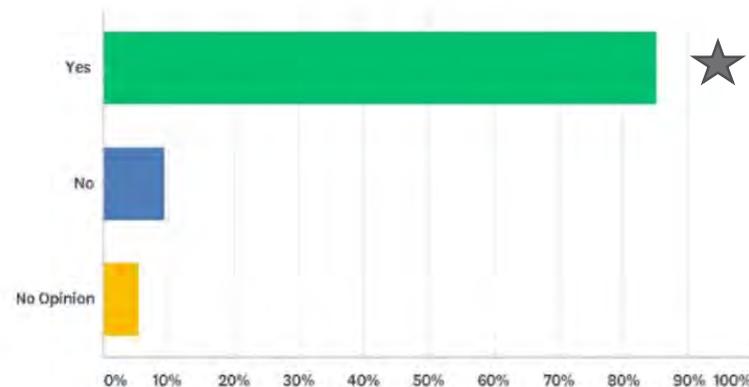


**Lower Heart River
Flood Control
Awareness ~60%**

**Question added
as there is no river
setback requirement**

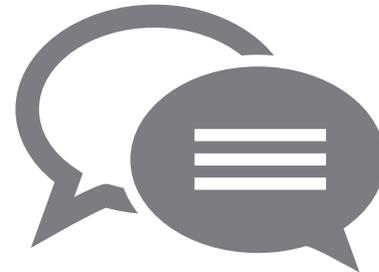
Q22 Do you believe that development along the Missouri River, Heart River or other streams should have a minimum building set back distance?

Answered: 128 Skipped: 1



SURVEY CONCLUSIONS

- Increase level of stormwater management
 - Additional staff and funding
- Ability to report, and increased responsiveness to, concerns from public
- Implement Education and Outreach Program
 - Increase community awareness and support
- Better inform public regarding future system improvements



SURVEY CONCLUSIONS

- Development burden on the public

- Infrastructure cost requirements



- Enforce contractor accountability for runoff

- Details outlined in ordinance revisions



- Review and Revise Special Assessment Distribution

- Lot size, runoff potential and storage options



- Expanded green space

- Construction setbacks





"WHERE THE WEST BEGINS"

NEW & EXPANDING BUSINESSES

New

- Many Visions Apparel, 100 Second Ave NW
- Lahr Agency, 2401 46th Ave SE Ste. 105

New Location

- Sparks Trailers (Great Plains Rentals), 4515 Memorial Hwy

Residents play vital role in stormwater master plan

The City of Mandan is continuing to develop a stormwater master plan. During the melting season and heavy rains, poor conveyance of stormwater may cause drainage issues.

The most common source of water pollution is runoff from lawns, roads, and agricultural land. Driveways, sidewalks and streets also prevent water from naturally soaking into the ground. Problems occur when pollutants like chemicals, dirt, and debris flow into stormwater systems or directly into streams, rivers and lakes. Anything entering these systems is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Common urban pollutants include oil and grease from roadways, pesticides, lawn clippings, dog waste, leaves, and trash such as cigarette butts, wrappers, cardboard, paper, grocery bags and plastic bottles.

Residents and property owners can help minimize this pollution. The Environmental Protection Agency has identified several household best practices for clean water.

- Compost or mulch yard waste. Do not sweep into streets or storm drains.
- Pick up and properly dispose of pet waste.
- Check vehicle, boats and other machinery for leaks. Clean up spilled fluids with an absorbent material like kitty litter or sand. Do not rinse the spill into a nearby storm drain.
- Recycle used oil and other automotive fluids.
- Use pesticides and fertilizers sparingly.
- Avoid overwatering the lawn.
- Use nontoxic, biodegradable, recycled and recyclable products when possible.
- Increase the amount of green space in your yard.



Using a commercial car wash is a simple way to help minimize stormwater pollution.

How the City helps prevent this pollution. The North Dakota Department of Health requires the City of Mandan to examine and improve actions to ensure a reduction in the amount and type of pollution that collects on streets, parking lots, open spaces, storage and vehicle maintenance areas and is discharged into local waterways. The City has a regular street cleaning program and works to reduce pollution resulting from land development and flood management practices or poor maintenance of storm sewer systems.



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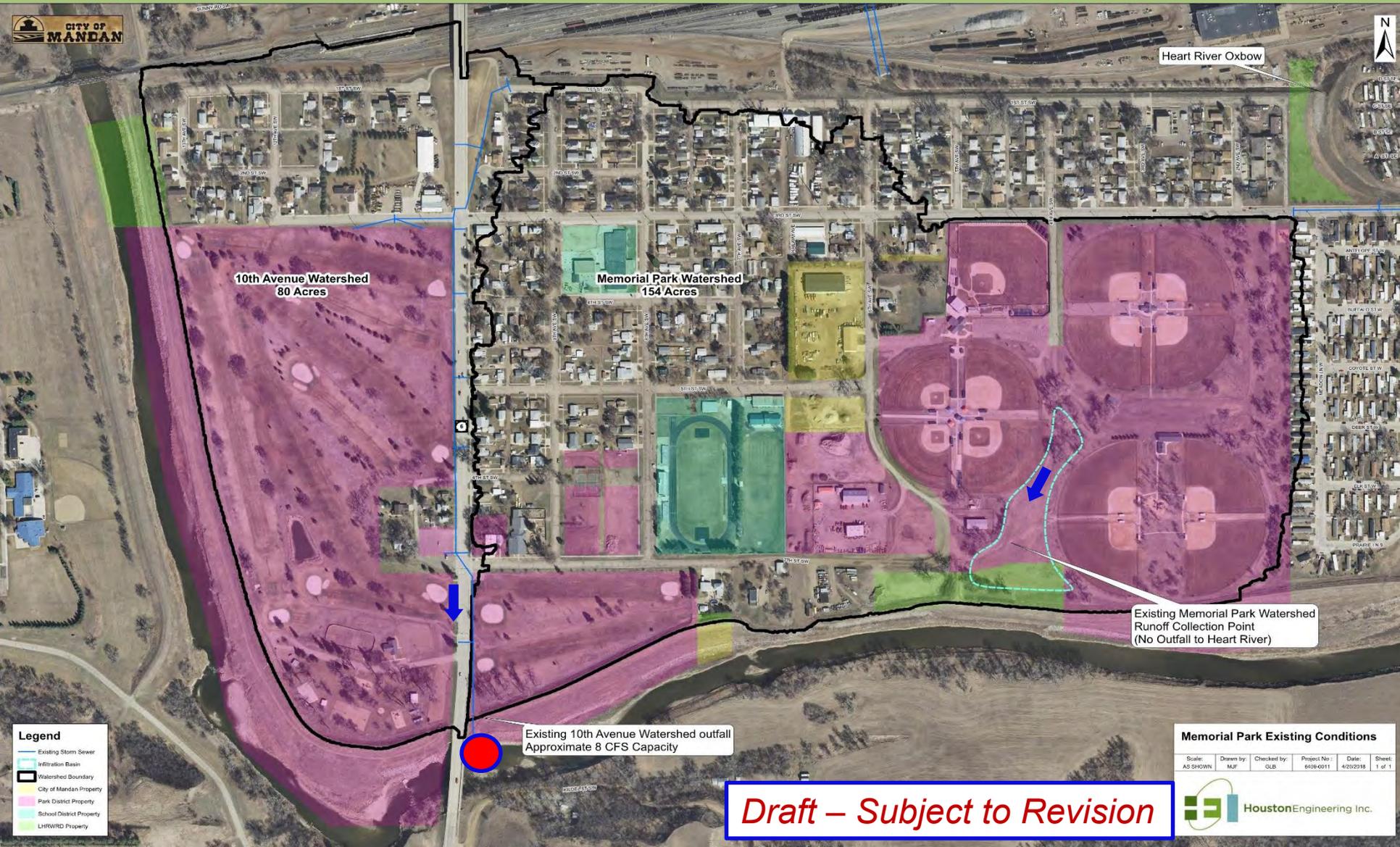
"WHERE THE WEST BEGINS"

PROBLEM SITE EVALUATIONS

Memorial Park Watershed

Downtown (Main St, 1st St, 2nd St)

MEMORIAL PARK PROBLEM SITE EXISTING CONDITIONS

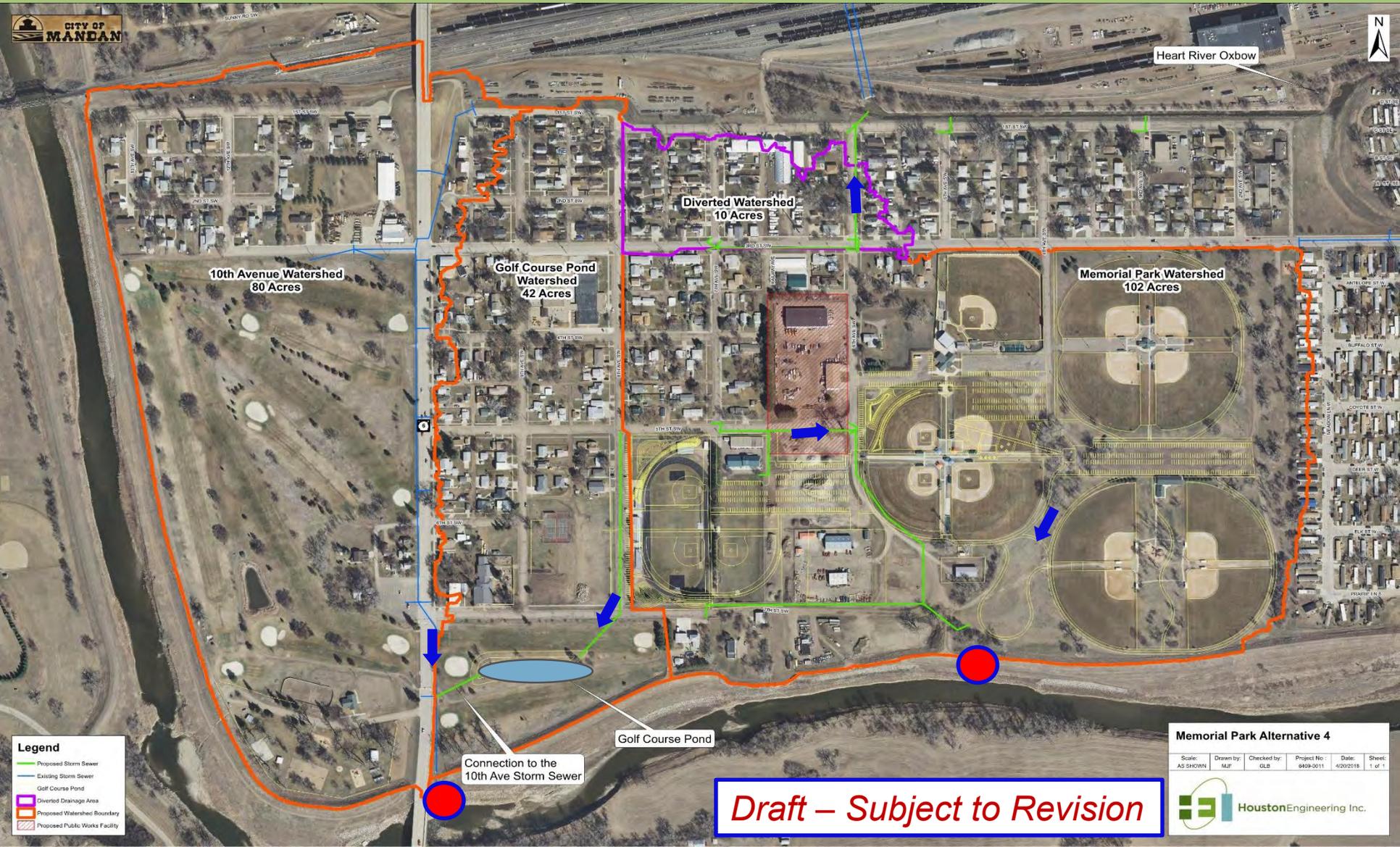


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Memorial Park Existing Conditions					
Scale: AS SHOWN	Drawn by: MJP	Checked by: SJB	Project No.: 6109-0011	Date: 4/20/2018	Sheet: 1 of 1

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MEMORIAL PARK: ALTERNATIVE 4



MEMORIAL PARK: ALTERNATIVE 1

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**Memorial Park Alternative 1
10-YR, 24-HR Flood Inundation**

Scale: AS SHOWN	Drawn by: MJP	Checked by: GLB	Project No: 6409-0011	Date: 4/23/2018	Sheet: 1 of 1
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10-year



**Memorial Park Alternative 1
25-YR, 24-HR Flood Inundation**

Scale: AS SHOWN	Drawn by: MJP	Checked by: GLB	Project No: 6409-0011	Date: 4/23/2018	Sheet: 1 of 1
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25-year

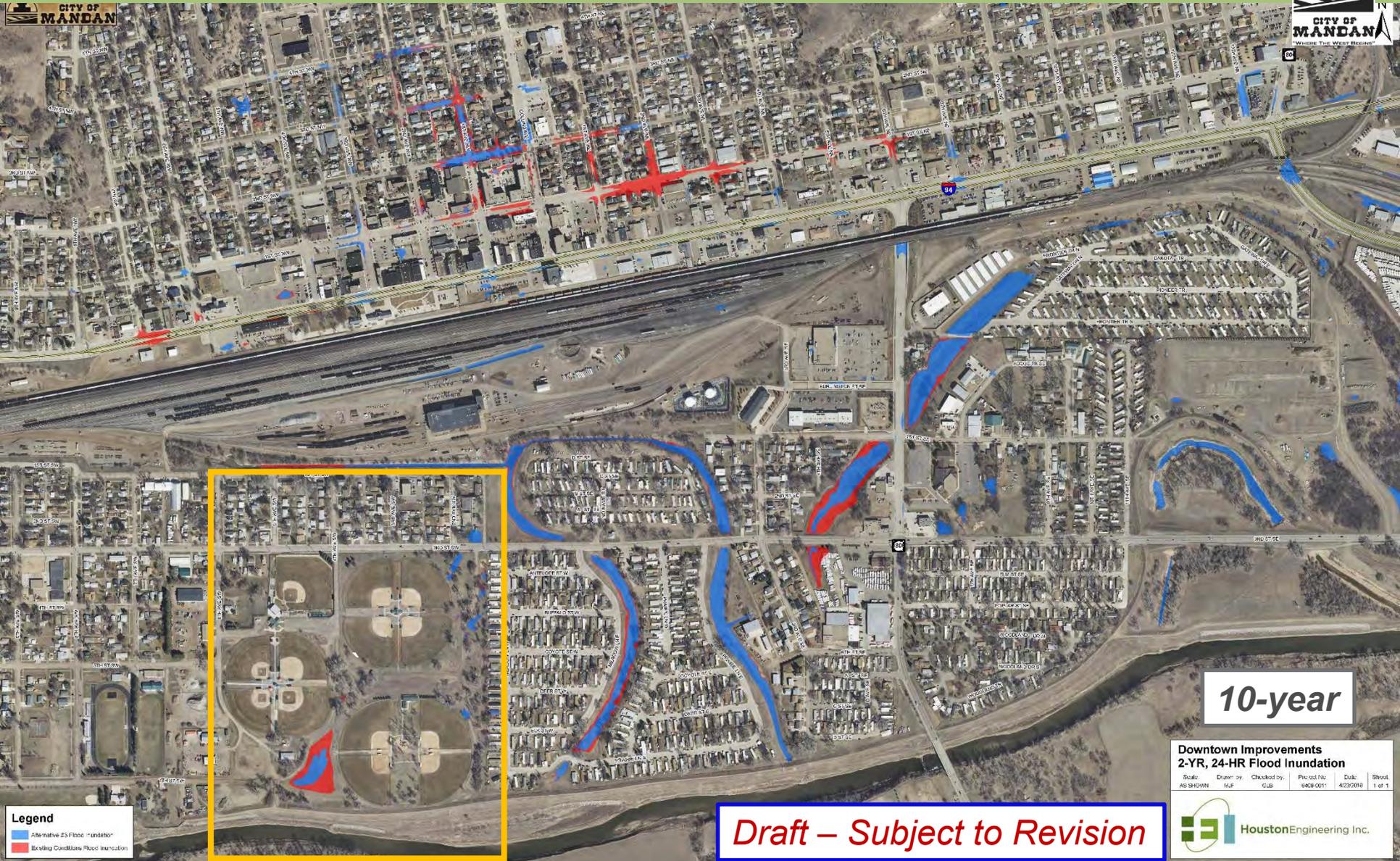


**Memorial Park Alternative 1
100-YR, 24-HR Flood Inundation**

Scale: AS SHOWN	Drawn by: MJP	Checked by: GLB	Project No: 6409-0011	Date: 4/23/2018	Sheet: 1 of 1
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100-year

DOWNTOWN (MAIN STREET/1ST STREET/2ND STREET)



10-year

**Downtown Improvements
2-YR, 24-HR Flood Inundation**

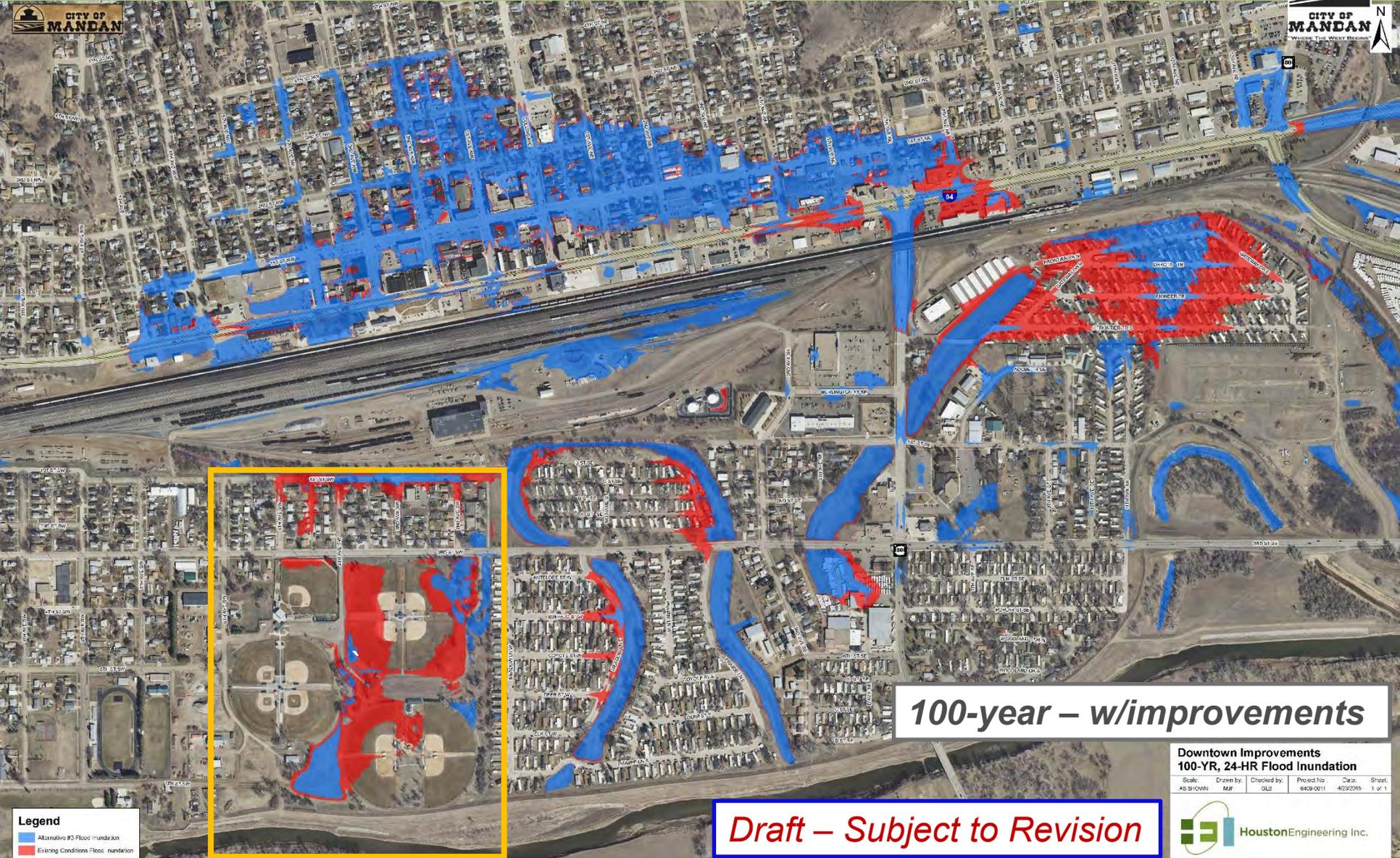
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Legend
■ Alternative 25 Flood Inundation
■ Existing Conditions Flood Inundation

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DOWNTOWN (MAIN STREET/1ST STREET/2ND STREET)



100-year – w/improvements

**Downtown Improvements
100-YR, 24-HR Flood Inundation**

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AS SHOWN	MJF	SLZ	6408-0011	4/29/2016	1 of 1

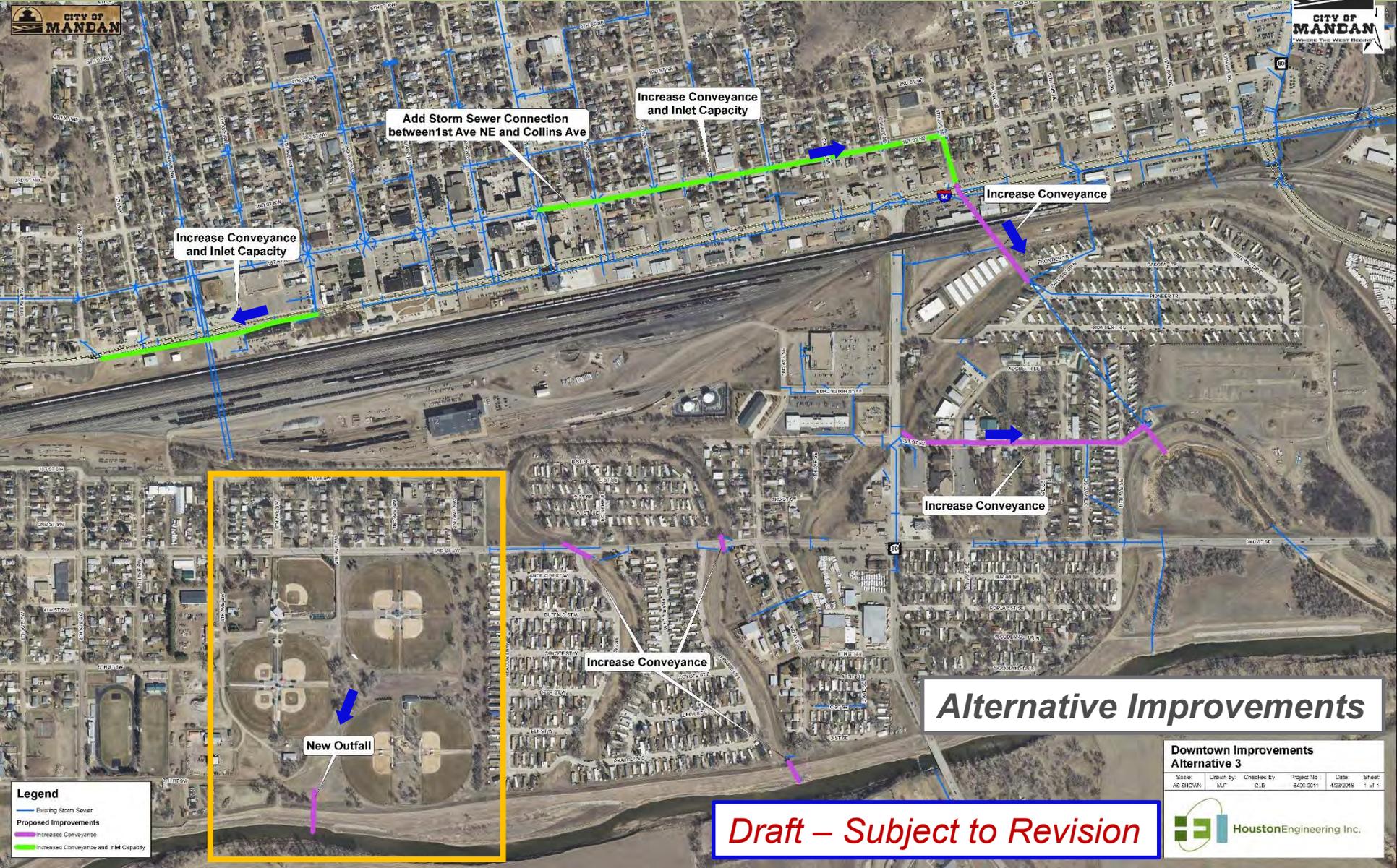


Legend

- Blue: Alternative #3 Flood Inundation
- Red: Existing Conditions Flood Inundation

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DOWNTOWN (MAIN STREET/1ST STREET/2ND STREET)



Increase Conveyance and Inlet Capacity

Add Storm Sewer Connection between 1st Ave NE and Collins Ave

Increase Conveyance and Inlet Capacity

Increase Conveyance

Increase Conveyance

Increase Conveyance

New Outfall

Alternative Improvements

Downtown Improvements Alternative 3				
Scale: AS SHOWN	Drawn by: MPT	Checked by: G.B.	Project No: 6429.001	Date: 4/29/2018
			Sheet: 1 of 1	

Legend

- Existing Storm Sewer
- Increase Conveyance
- Increase Conveyance and Inlet Capacity

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"WHERE THE WEST BEGINS"

MASTER PLAN WATERSHEDS

I-94 Watershed (NW Mandan)

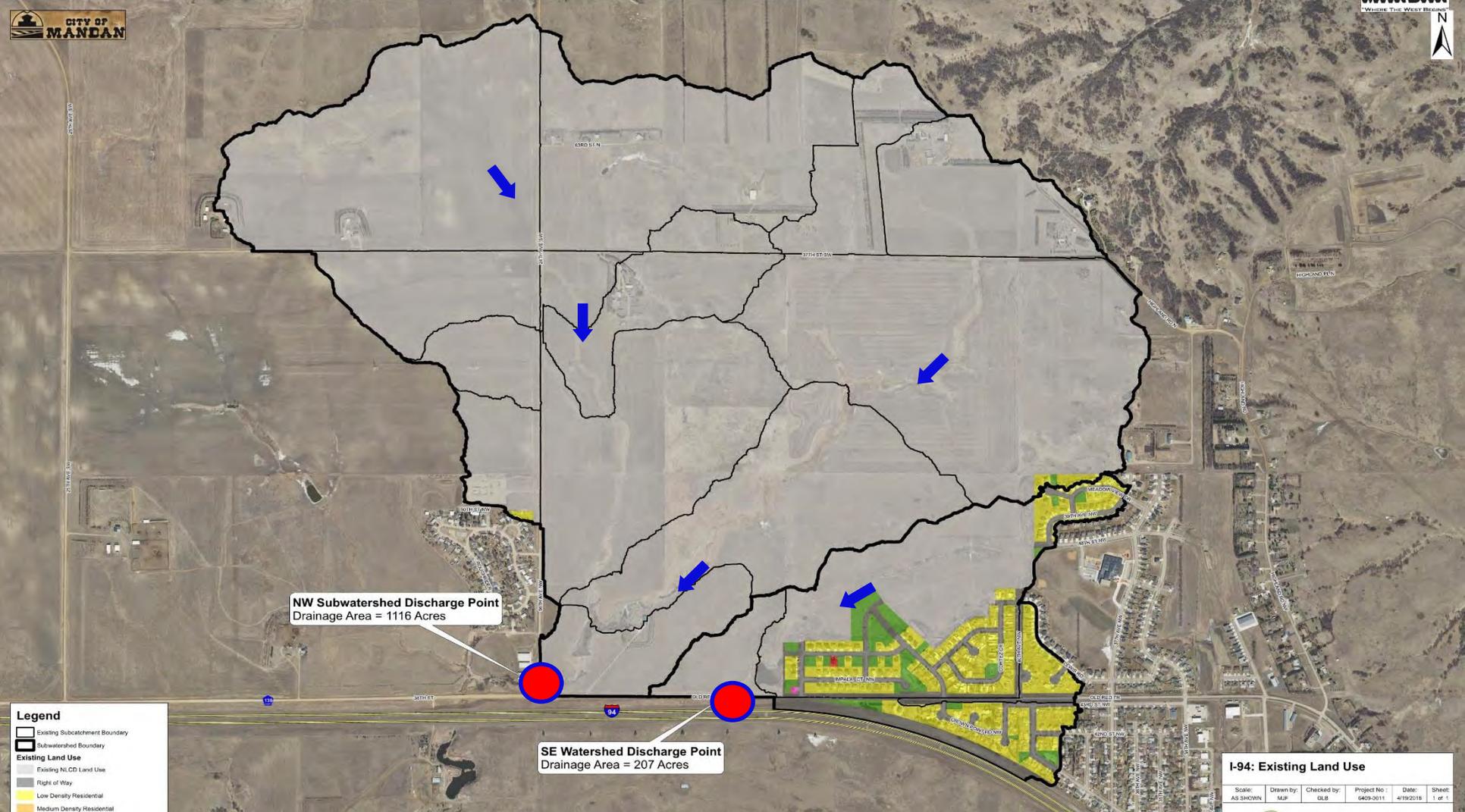
Terra Vallee Watershed (Andeavor)

Sunset Drive Watershed (Downtown)



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I-94 WATERSHED - EXISTING LAND USE



NW Subwatershed Discharge Point
Drainage Area = 1116 Acres

SE Watershed Discharge Point
Drainage Area = 207 Acres

- Legend**
- Existing Subcatchment Boundary
 - Subwatershed Boundary
 - Existing Land Use**
 - Existing NLCD Land Use
 - Right of Way
 - Low Density Residential
 - Medium Density Residential
 - High Density Residential
 - Commercial
 - Parks and Open Space
 - Institutions (Schools, Churches, Government)

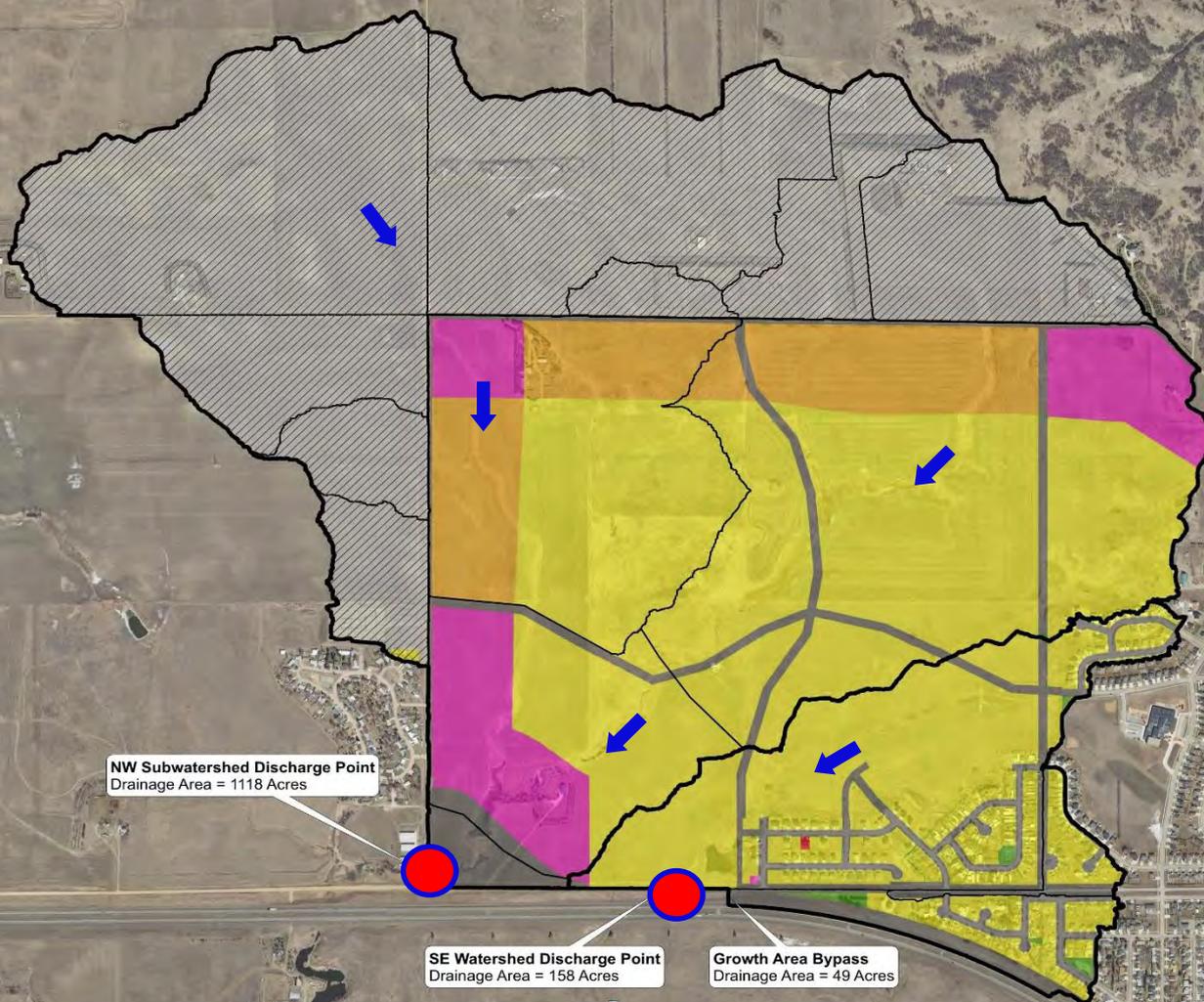
I-94: Existing Land Use

Scale: AS SHOWN	Drawn by: MAP	Checked by: GLS	Project No: 6409-3011	Date: 4/19/2018	Sheet: 1 of 1
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I-94 WATERSHED - FUTURE LAND USE



NW Subwatershed Discharge Point
Drainage Area = 1118 Acres

SE Watershed Discharge Point
Drainage Area = 158 Acres

Growth Area Bypass
Drainage Area = 49 Acres

Legend

- Drainage Area Outside of Growth Area
- Future Subwatershed Boundary
- Future Subwatershed Boundary

Future Land Use

- Existing NLCD Land Use
- Right of Way
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Parks and Open Space
- Institutions (Schools, Churches, Government)

I-94: Future Land Use					
Scale:	Drawn by:	Checked by:	Project No.:	Date:	Sheet:
AS SHOWN	MAP	GLB	6109-0011	4/19/2018	1 of 1

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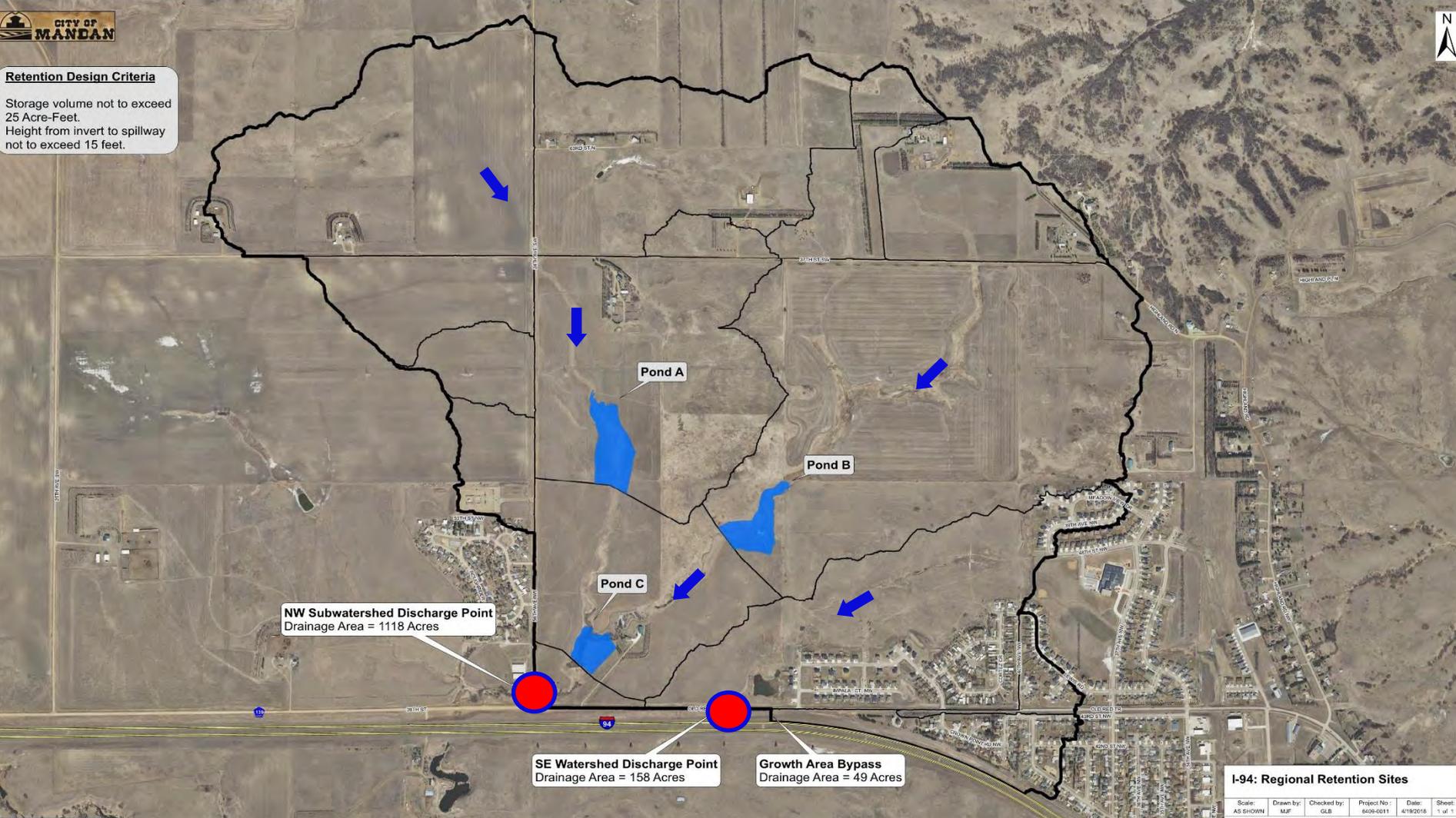


I-94 WATERSHED - REGIONAL RETENTION



Retention Design Criteria

Storage volume not to exceed 25 Acre-Feet.
 Height from invert to spillway not to exceed 15 feet.



Legend

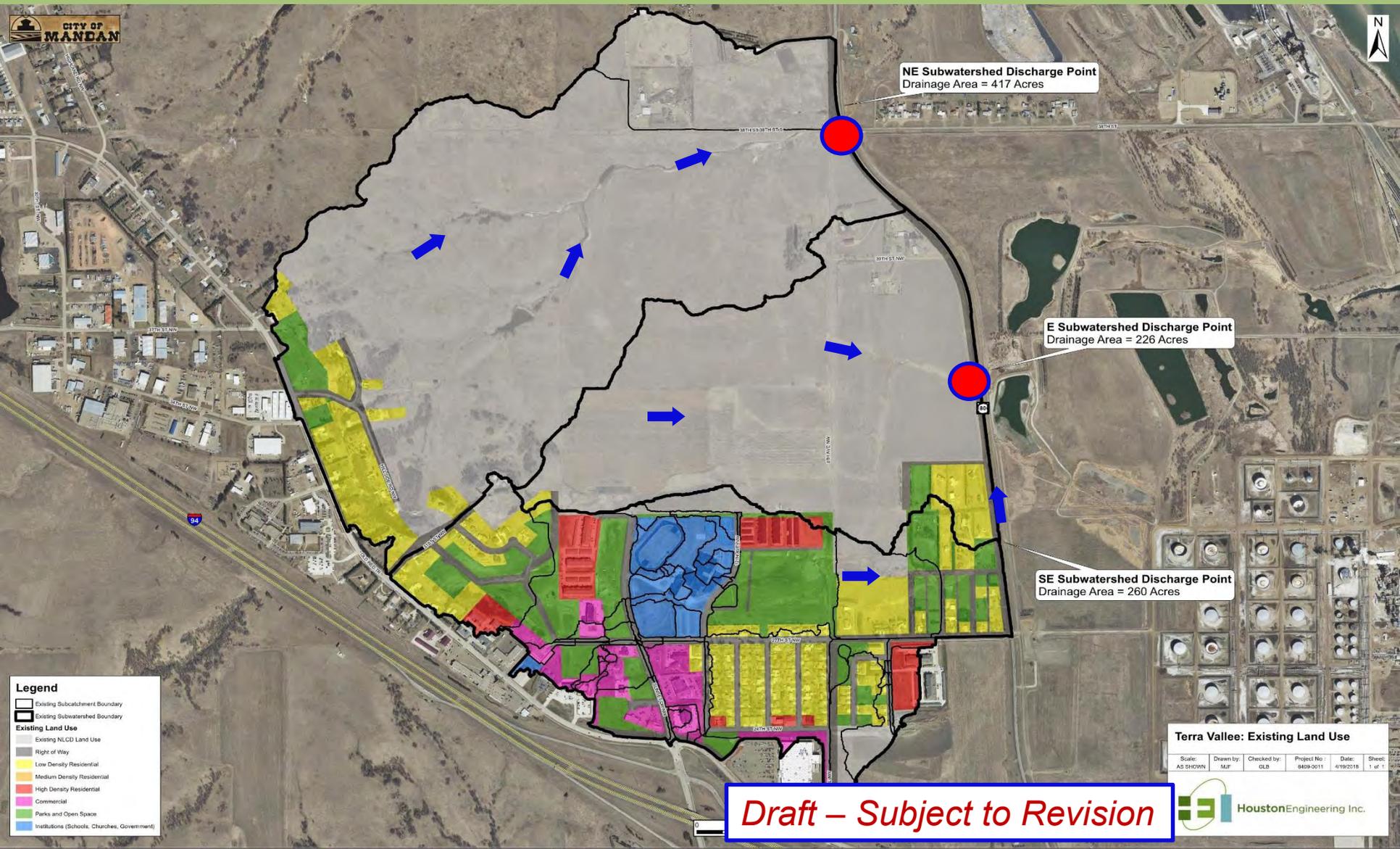
- Future Pond 100 Year Extents
- Future Subcatchment Boundary
- Future Watershed Boundary

I-94: Regional Retention Sites

Scale: AS SHOWN	Drawn by: MJF	Checked by: GLB	Project No.: 6408-0311	Date: 4/19/2018	Sheet: 1 of 1
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TERRA VALLEE : EXISTING LAND USE



NE Subwatershed Discharge Point
Drainage Area = 417 Acres

E Subwatershed Discharge Point
Drainage Area = 226 Acres

SE Subwatershed Discharge Point
Drainage Area = 260 Acres

Legend

- Existing Subcatchment Boundary
- Existing Subwatershed Boundary
- Existing Land Use**
- Existing NLCD Land Use
- Right of Way
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Parks and Open Space
- Institutions (Schools, Churches, Government)

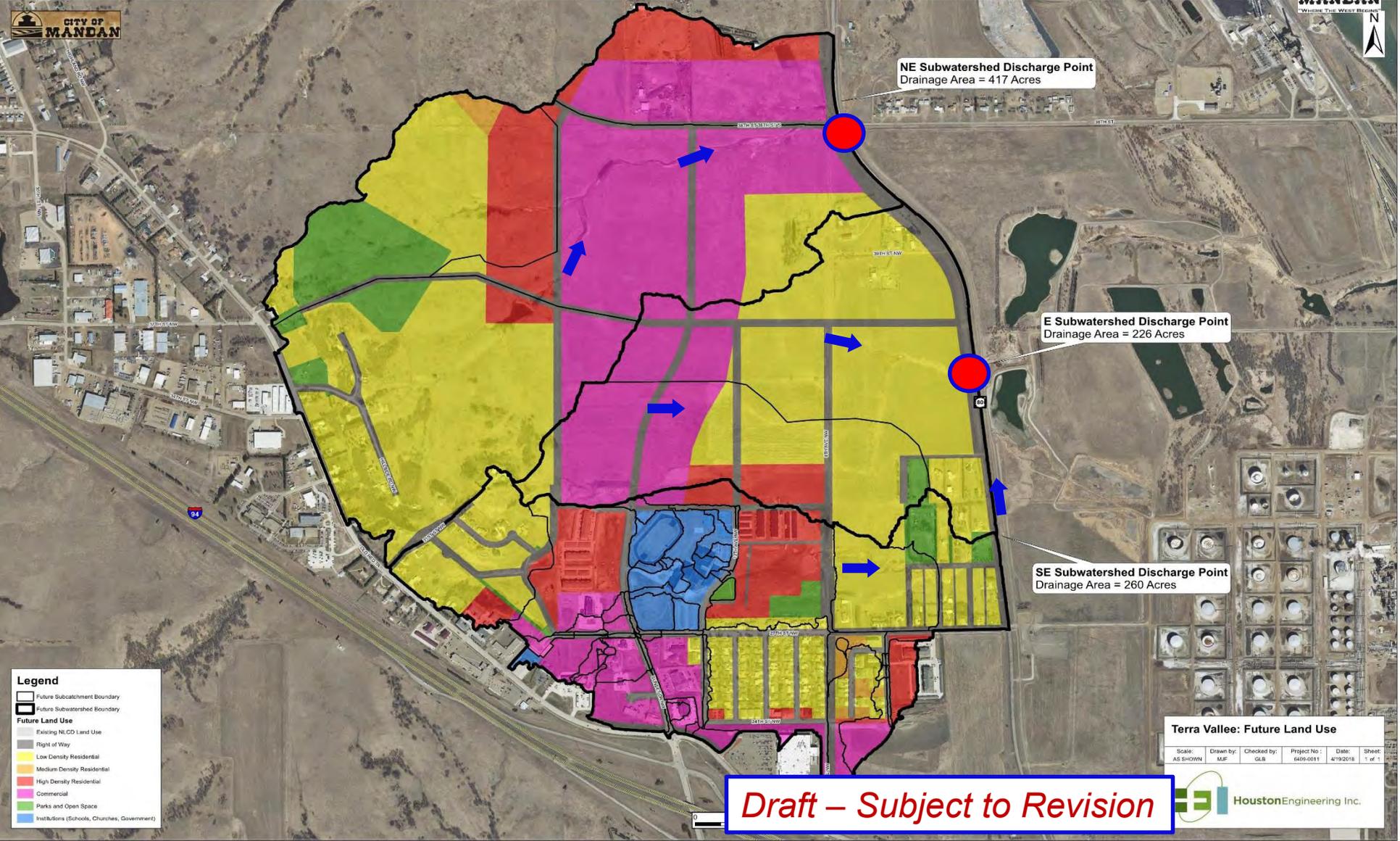
Terra Valle: Existing Land Use

Scale:	AS SHOWN	Drawn by:	ML	Checked by:	GLB	Project No:	8409-0011	Date:	4/19/2018	Sheet:	1 of 1
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TERRA VALLEE : FUTURE LAND USE



NE Subwatershed Discharge Point
Drainage Area = 417 Acres

E Subwatershed Discharge Point
Drainage Area = 226 Acres

SE Subwatershed Discharge Point
Drainage Area = 260 Acres

Legend

- Future Subcatchment Boundary
- Future Subwatershed Boundary
- Existing N.C.D. Land Use
- Right of Way
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Parks and Open Space
- Institutions (Schools, Churches, Government)

Draft – Subject to Revision

Terra Valle: Future Land Use

Scale: AS SHOWN	Drawn by: MUF	Checked by: GJB	Project No: 6409-0011	Date: 4/26/2018	Sheet: 1 of 1
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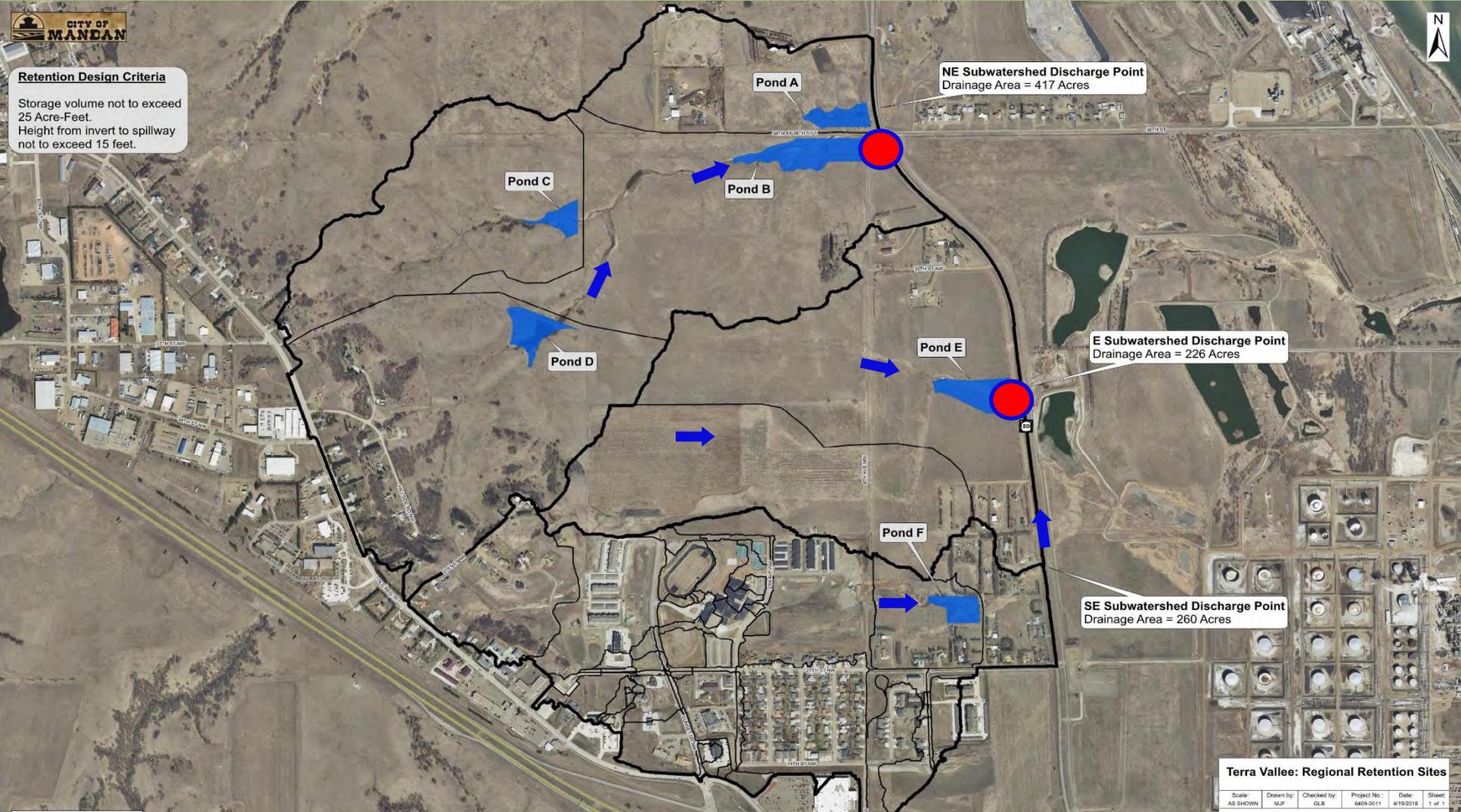
HoustonEngineering Inc.

TERRA VALLEE : REGIONAL RETENTION



Retention Design Criteria

Storage volume not to exceed 25 Acre-Feet.
 Height from invert to spillway not to exceed 15 feet.



Legend

- Future Pond 100 Year Extents
- Future Subcatchment Boundary
- Future Subwatershed Boundary

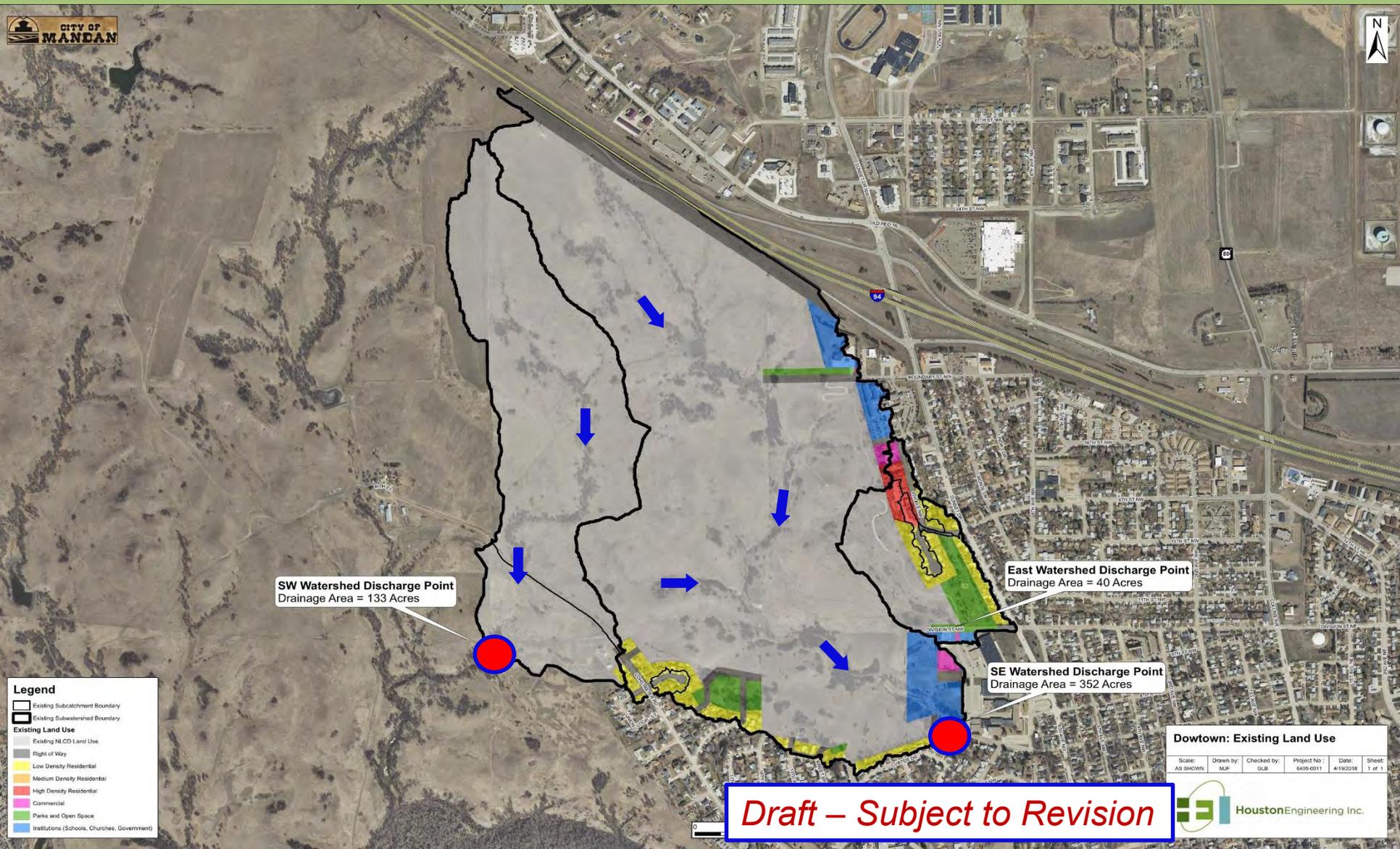
Draft – Subject to Revision

Terra Valle: Regional Retention Sites

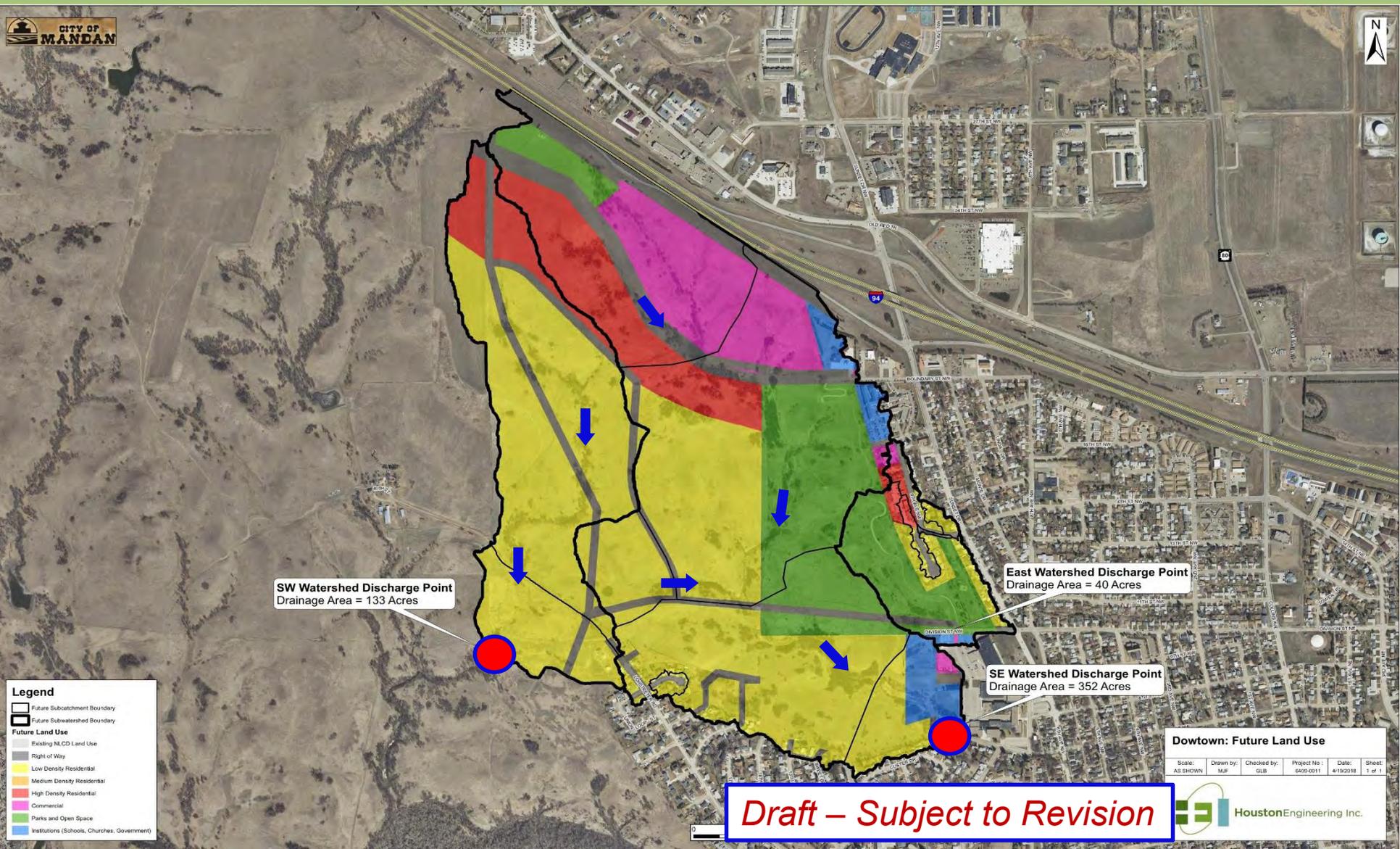
Scale: AS SHOWN	Drawn by: MAP	Checked by: GLB	Project No.: 1409-0011	Date: 4/19/2018	Sheet: 1 of 1
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SUNSET DRIVE : EXISTING LAND USE



SUNSET DRIVE : FUTURE LAND USE



SW Watershed Discharge Point
Drainage Area = 133 Acres

East Watershed Discharge Point
Drainage Area = 40 Acres

SE Watershed Discharge Point
Drainage Area = 352 Acres

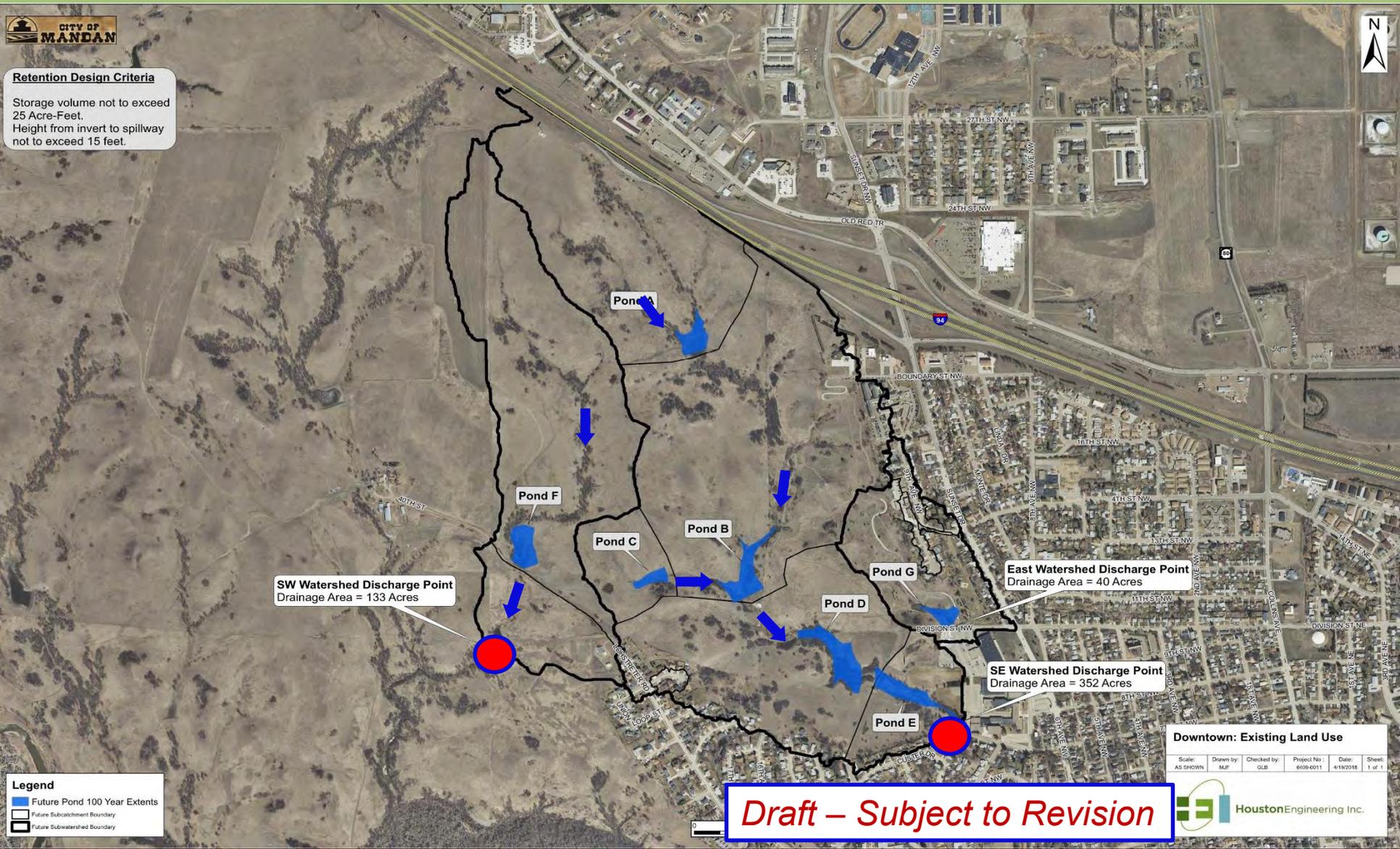
- Legend**
- Future Subcatchment Boundary
 - Future Subwatershed Boundary
 - Future Land Use**
 - Existing NLCD Land Use
 - Right of Way
 - Low Density Residential
 - Medium Density Residential
 - High Density Residential
 - Commercial
 - Parks and Open Space
 - Institutions (Schools, Churches, Government)

Downtown: Future Land Use

Scale:	Drawn by:	Checked by:	Project No.:	Date:	Sheet:
AS SHOWN	M.J.F.	GLB	6405-0011	4/19/2018	1 of 1

Draft – Subject to Revision

SUNSET DRIVE : REGIONAL DETENTION



Retention Design Criteria

Storage volume not to exceed 25 Acre-Feet.
Height from invert to spillway not to exceed 15 feet.

SW Watershed Discharge Point
Drainage Area = 133 Acres

East Watershed Discharge Point
Drainage Area = 40 Acres

SE Watershed Discharge Point
Drainage Area = 352 Acres

Legend

- Future Pond 100 Year Extents
- Future Subcatchment Boundary
- Future Subwatershed Boundary

Downtown: Existing Land Use

Scale:	AS 09/09/11	Drawn by:	MJP	Checked by:	GLB	Project No.:	6008-0011	Date:	4/18/2018	Sheet:	1 of 1
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Draft – Subject to Revision



**CITY OF
MANDAN**

"WHERE THE WEST BEGINS"

STORMWATER ORDINANCE AND MANUAL UPDATES

STORMWATER ORDINANCE



Regulations - Review and Considerations:

- ***Update and add new definitions***
- ***Improve functionality***
- ***Clarifications on language and intent***
- ***Increase enforceability and accountability***
- ***MS4 Compliance***
- ***Stormwater Assessment Provisions***

***Modifications through a public hearing and
City Commission approval***

Policy Document – Technical

- *Review and Recommendations Only*
- *Technical Updates*
 - *Historic rainfall records and distribution data (1961 to 2011 Add 50 yrs)*
 - *Analysis Methods (Acceptability)*
 - *Runoff Generation Ratios (Special Assessment Use)*
 - *Plan Implementation Certifications*
- *Fee Considerations*
 - *ESCP = Erosion and Sedimentation Control Permits (MS4)*
 - *Application Review and Enforcement*
 - *SWMP = Stormwater Management Plan*
 - *Application Review and Enforcement*

*Changes made at Staff level by
City Engineer, adoption by City Commission.*



**CITY OF
MANDAN**

"WHERE THE WEST BEGINS"

STORMWATER MANAGEMENT PLAN

Executive Summary + Appendices



HoustonEngineering Inc.



**CITY OF
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"WHERE THE WEST BEGINS"

OTHER TOPICS

Questions?

Thank You!



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PE

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