

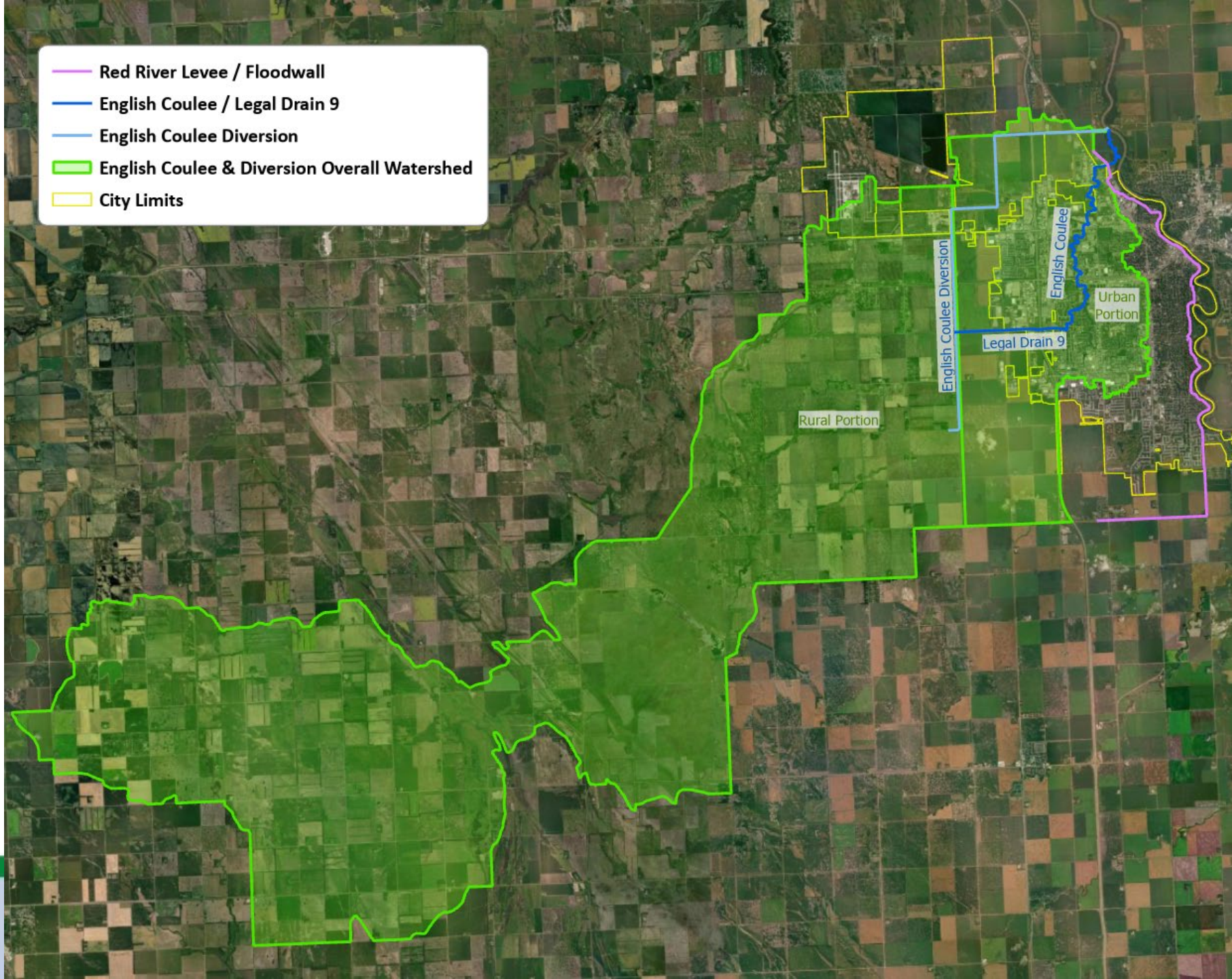
ENGLISH COULEE FLOOD STUDY

January 12, 2026



English Coulee Drainage Basin

- Red River Levee / Floodwall
- English Coulee / Legal Drain 9
- English Coulee Diversion
- English Coulee & Diversion Overall Watershed
- City Limits



Model Runs

- 27 model runs completed
- Summary of 18 runs below

2025 English Coulee Improvement Alternatives (After 2024 Final Calibration; Purpose: Evaluate solutions to reduce water levels to be closer to FEMA effective elevations)				
2025 Alternative 01	100-yr	Summer Thunderstorm	Opp crossing: constant road crest at 821', (5) 10'x5' culverts, remove check dam, widen channel, remove upstream railroad bridge; Altru storage: (3) offline ponds (16.5 acre total footprint) that fill from the channel overflow berm at 827'.	Significant reduction in peak water levels throughout (-1.2' at Demers Ave). Likely that this storage is inadequate for the PDA3 future buildout condition.
2025 Alternative 02	100-yr	Summer Thunderstorm	Opp crossing: constant road crest at 821, (5) 10'x5' culverts, remove check dam, widen channel, remove upstream railroad bridge.	Significant reduction in peak water levels between 6th Ave and Gateway Dr; minor benefit upstream of Demers Ave (-0.3').
2025 Alternative 02-B	100-yr	Summer Thunderstorm	Same as Alt-02 but with (5) 48" culverts instead of boxes.	Roughly half the benefit of Alt-02.
2025 Alternative 03	100-yr	Summer Thunderstorm	Same as Alt-01 but Altru storage overflow berm increased to 828.5' (existing sidewalk + 1.5').	Significant reduction in peak water levels throughout, slightly better than Alt-01 (-1.4 at Demers Ave). Likely that this storage is inadequate for the PDA3 future buildout condition.
2025 Alternative 04	100-yr	Summer Thunderstorm	Opp crossing: constant road crest at 821, (5) 10'x5' culverts, remove check dam, widen channel, remove upstream railroad bridge; Remove contribution from Vail Circle pump station (PS 188 & PS 182; -170 cfs after calibration).	Significant reduction in peak water levels throughout, slightly less than Alt-01 (-1.1' at Demers Ave).
2025 Alternative 05	100-yr	Summer Thunderstorm	Coulee channel expansion/storage along the SE branch near the mall.	Insufficient storage volume leads to negligible change in water levels downstream.
2025 Alternative 06	100-yr	Summer Thunderstorm	Opp crossing: constant road crest at 821, (5) 48" culverts, remove check dam, widen channel, remove upstream railroad bridge; Add 250-cfs pump station from upstream of Demers Ave to downstream of railroad crossing.	Modest benefit upstream of Demers Ave (-0.6').
PDA3 Development Alternatives (After 2024 Final Calibration)				
2025 PDA3 Alternative 01	100-yr	Summer Thunderstorm	Purpose was to determine the PDA3 storage volume required to avoid a rise downstream on the Coulee, using an open channel for storing and routing runoff south to north within PDA3.	PDA3 future development storage volume needed was 50.3 acre-feet per quarter section, with an average pond area of 8.45 acres per quarter section. See Tech Memo for more details.
2025 PDA3 Alternative 02	100-yr	Summer Thunderstorm	Purpose was to determine the PDA3 storage volume required to avoid a rise downstream on the Coulee, using closed stormsewer for routing runoff south to north within PDA3.	PDA3 future development storage volume needed was 57.5 acre-feet per quarter section, with an average pond area of 8.54 acres per quarter section. See Tech Memo for more details.
2025 PDA3 Alternative 03	100-yr	Summer Thunderstorm	Evaluate the impact of a higher percent impervious throughout the PDA3 full buildout scenario with the same configuration as Alt-02.	PDA3 development future storage volume needed was 60 acre-feet per quarter section, a notable increase from Alt-02.
Spring Snowmelt / Gates Closed 1% Event (Critical Storm Duration Analysis; After 2024 Final Gates Open Calibration)				
Existing Conditions: 24 hr SCS		1% Spring Snowmelt & Gates Closed	1% Equivalent Rainfall Depth for Coincident Probability of Spring Rain on Snow and Gate Closure; 24-hr SCS Type II Distribution	
Existing Conditions: 48-hr SCS		1% Spring Snowmelt & Gates Closed	48-hr SCS Type II Distribution	Controlling event for the spring/gates closed event; 1.7-foot rise above FEMA effective ponding elevation.
Existing Conditions: 72-hr SCS		1% Spring Snowmelt & Gates Closed	72-hr SCS Type II Distribution	
Existing Conditions: 48-hr Q1		1% Spring Snowmelt & Gates Closed	48-hr NOAA 1st Quartile 90th Percentile Distribution	
English Coulee Gates Closed Alternatives (Purpose: Evaluate solutions to reduce ponding elevation to the FEMA effective ponding elevation)				
EC GC Alternative 01		1% Spring Snowmelt & Gates Closed	Determine the pump capacity increase required to reduce ponding elevations down to FEMA elevations, assuming PDA3 contributes as in existing conditions.	Downstream of Gateway Dr: Pumping at 2x capacity (551 cfs) lowers ponding below FEMA. Upstream of Gateway Dr: Pumping at 2x or even 3x does not lower elevations below FEMA due to channel capacity limitations.
EC GC Alternative 02		1% Spring Snowmelt & Gates Closed	Existing Conditions, but removing contribution west of the interstate	Reduces ponding elevation at the outlet by 1.1' (still 0.6' above FEMA).
EC GC Alternative 03		1% Spring Snowmelt & Gates Closed	Determine the pump capacity increase required to reduce ponding elevations down to FEMA elevations, assuming PDA3 is discharged to EC Diversion	Downstream of Gateway Dr: Pumping at 1.5x capacity (413 cfs) lowers ponding below FEMA. Upstream of Gateway Dr: Pumping at 2x does not lower elevations below FEMA due to channel capacity limitations.
2025 Updated Existing Conditions (Addition of 3 pumps at PS 186 and 2 more pumps at PS 182)				
Existing Conditions (Nov 2025)	100-yr	Summer Thunderstorm	No alternatives have been run after this update.	Increase in peak water levels throughout (-0.5 at Demers Ave).

What Have We Learned So Far?

- Existing & Developed Conditions in EC watershed show water elevations between the old 1985 Flood Insurance Rate Map (FIRM) and the current FIRM
- System is extremely dynamic with multiple features (culverts, bridges, dams, etc.) that impact water elevations
- Solutions in gates open events don't always coincide with solutions for gates closed events
- Similar to South End Drainway, sometimes it acts like a channel, sometimes it acts like a retention basin
- No single solution – will likely need a multi-layered approach
- Identified a single point of failure risk

High Probability Solutions

- Flows from west of I-29 need to be controlled heavily or eliminated
- English Coulee Pump Station capacity improvements will be needed
- A plan to disconnect back-flooding areas is needed
- Alternate discharge points and/or large storage features are needed

English Coulee Potential Solution Areas



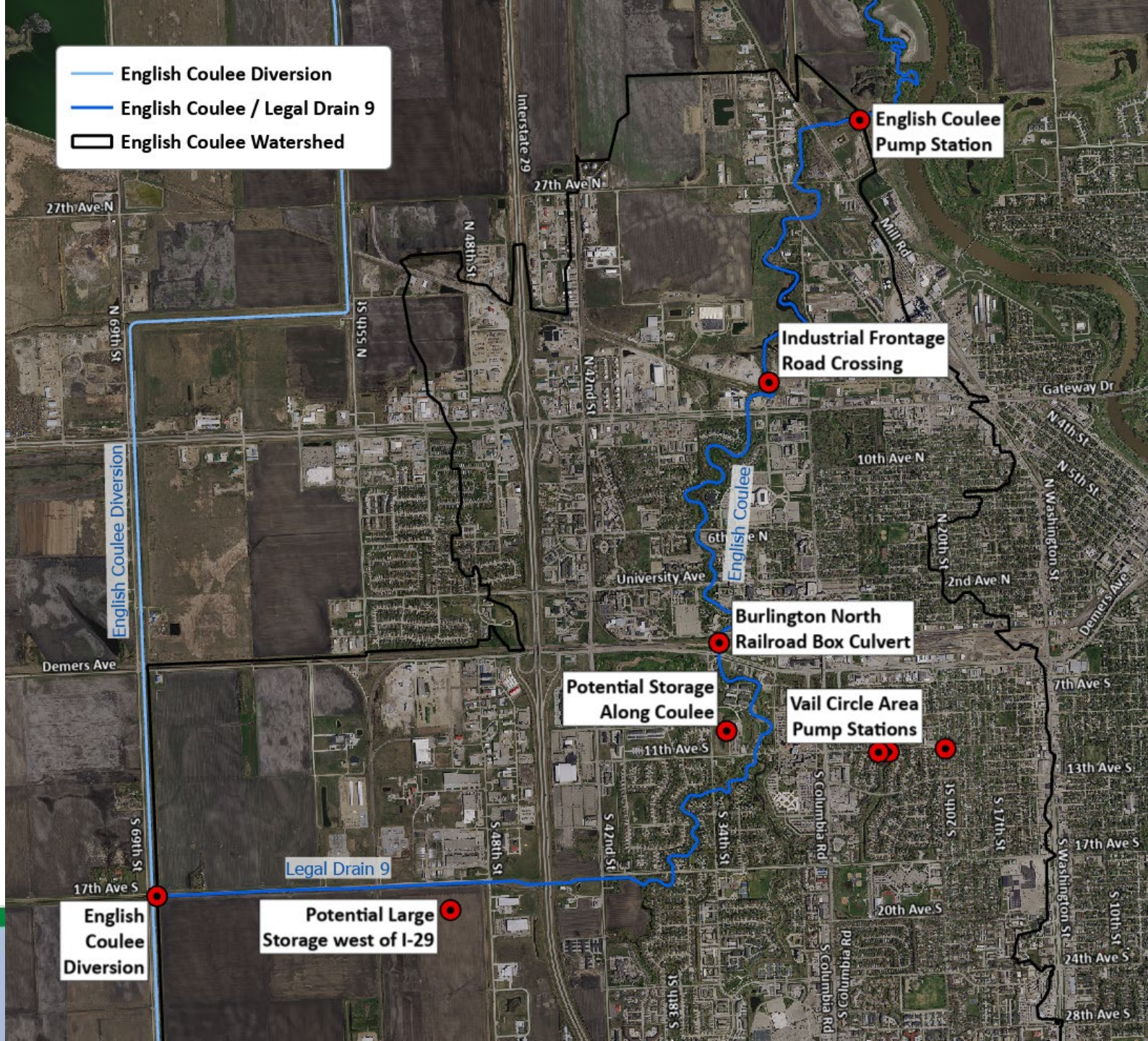
CONCEPT CARRIED FORWARD



CONCEPT PAUSED

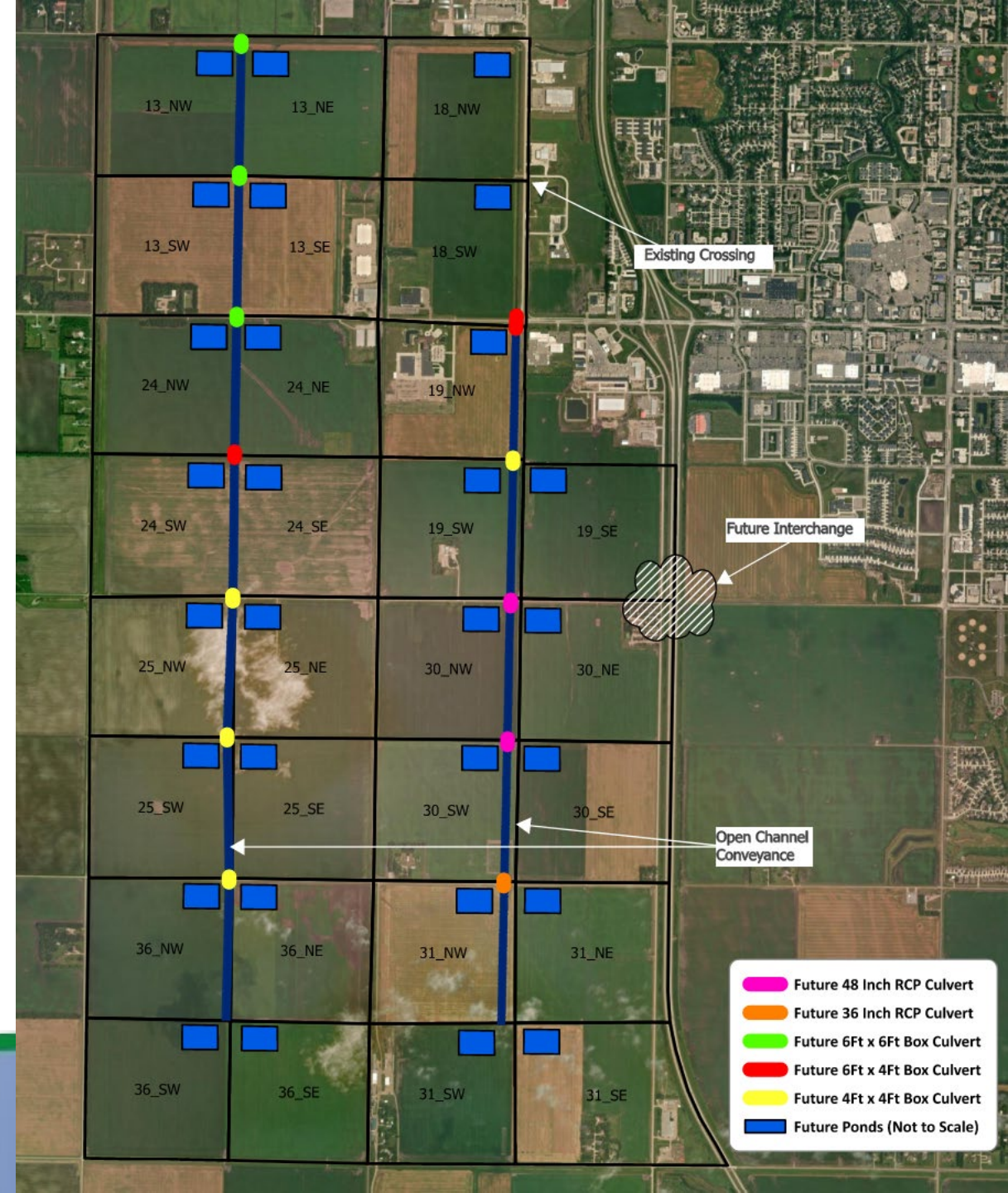


CONCEPT DROPPED

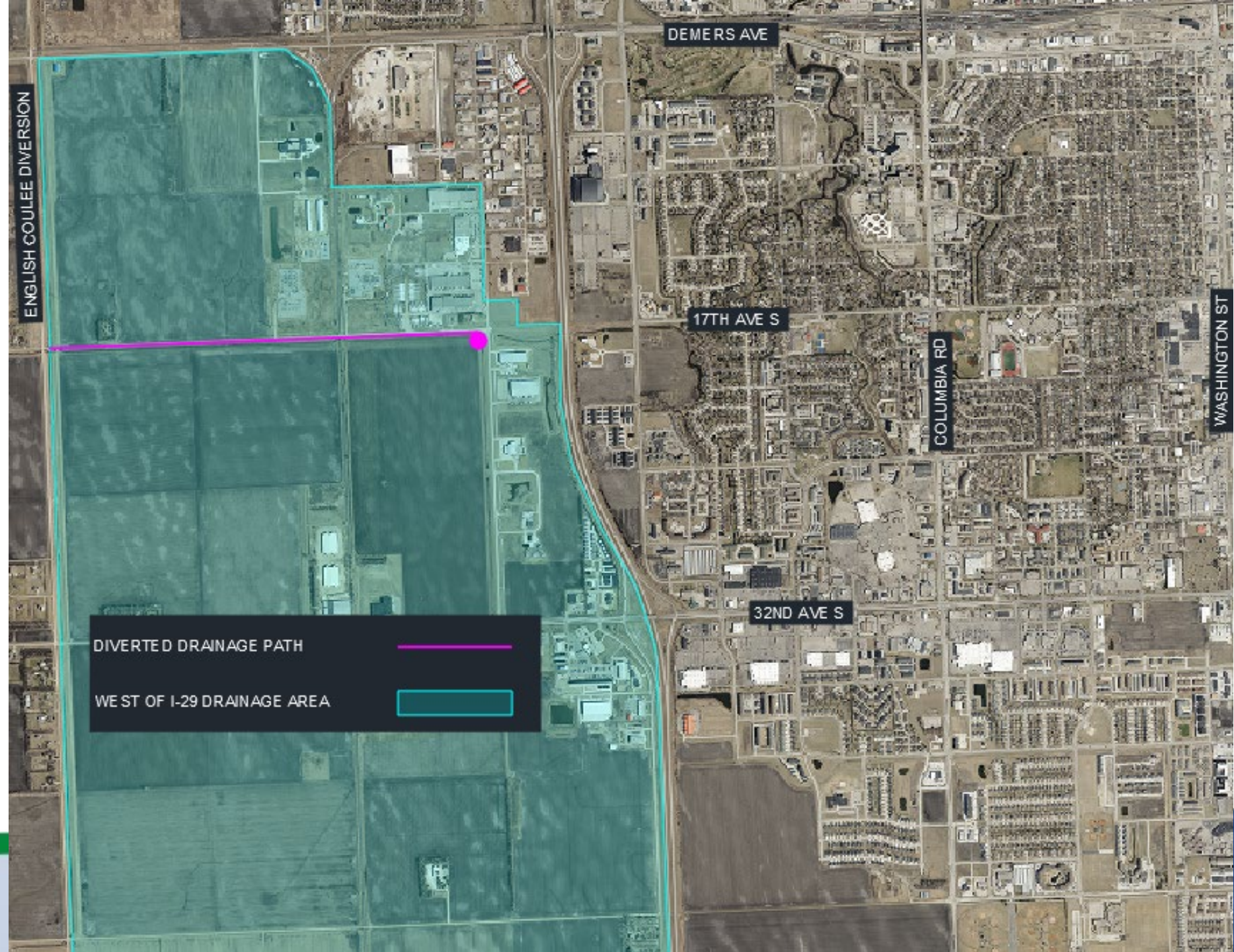


Baseline West of I-29 Development Layout

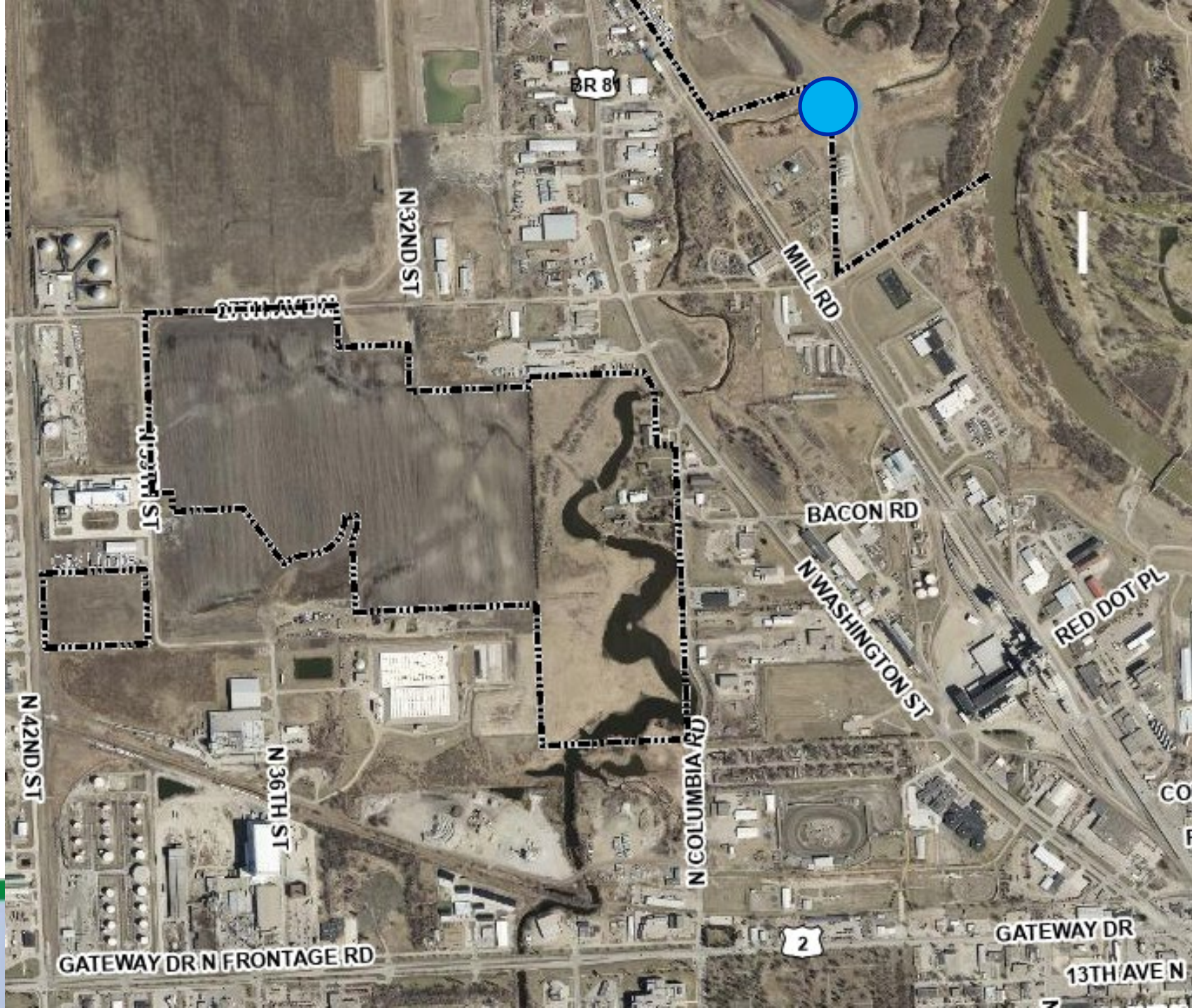
- 45 ac-ft / ¼ section ponds
Identical requirements to South End Drainway (SED) study
- Waterway/Storage Channel
- Necessary component to S 48th St & 47th Ave S Interchange Infrastructure Development



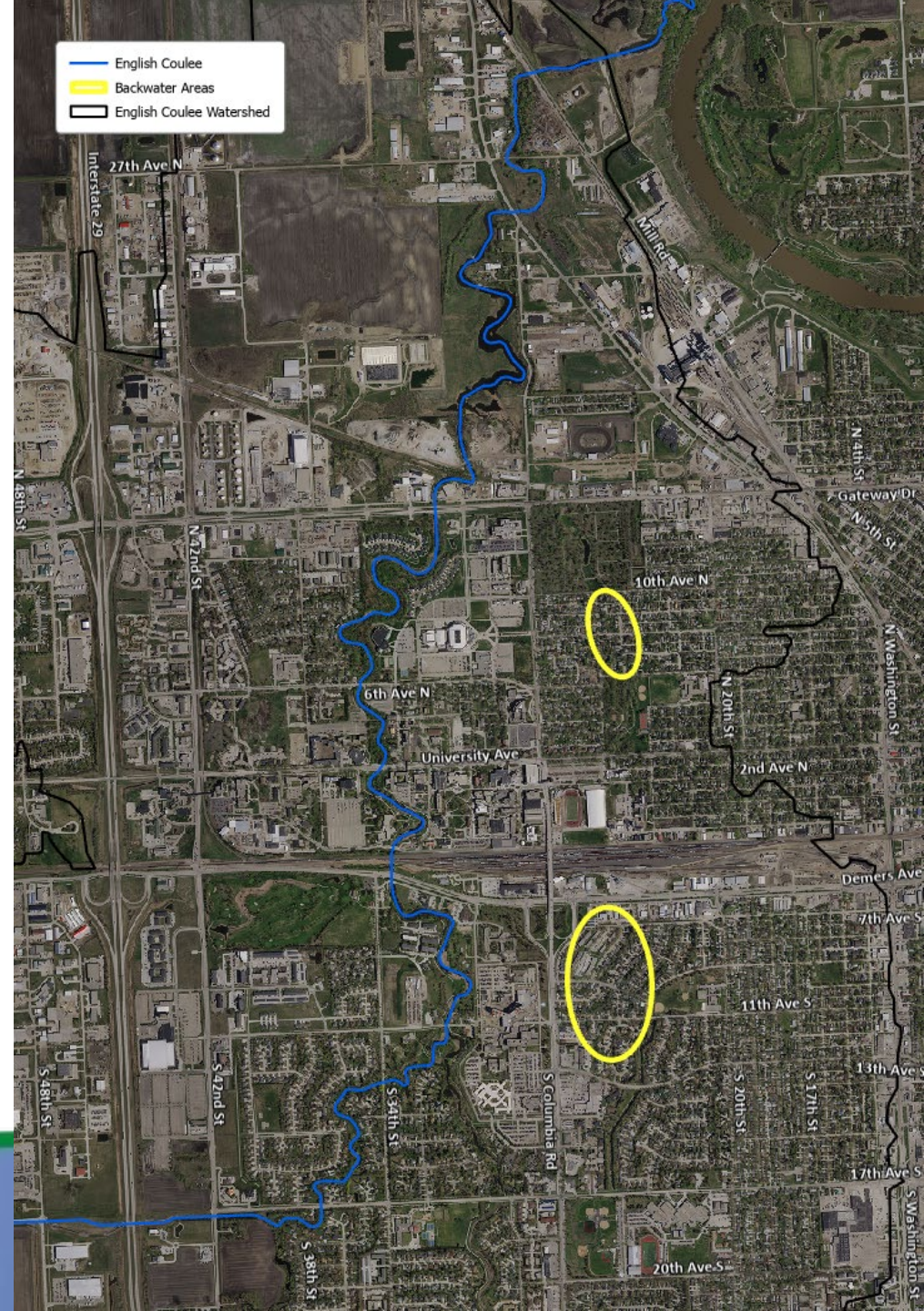
Divert Water to English Coulee Diversion



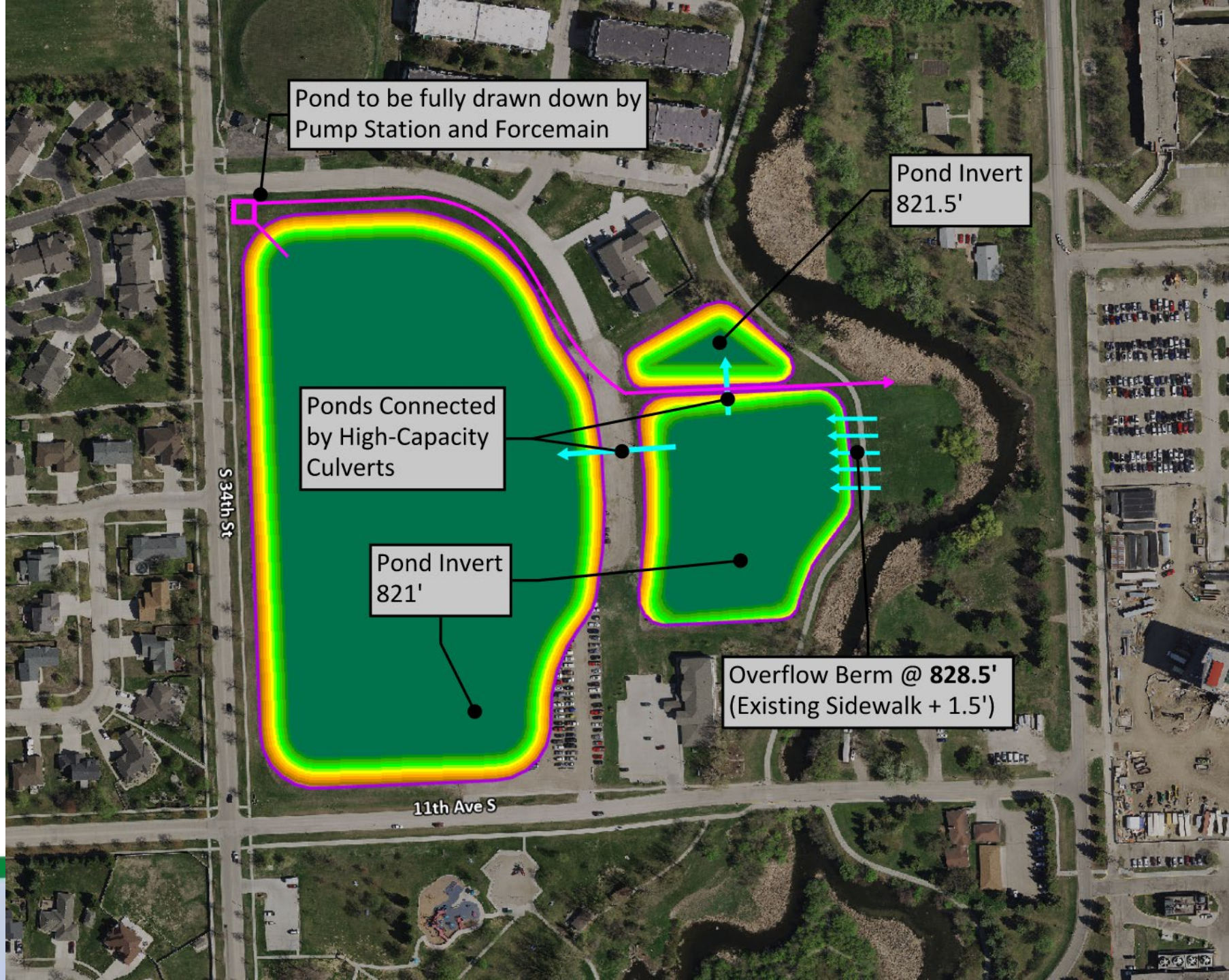
English Coulee Outfall Pump Station Improvements



English Coulee Backwater Areas Map



11th Ave S Storage & Pump Station



Pond to be fully drawn down by Pump Station and Forcemain

Pond Invert 821.5'

Ponds Connected by High-Capacity Culverts

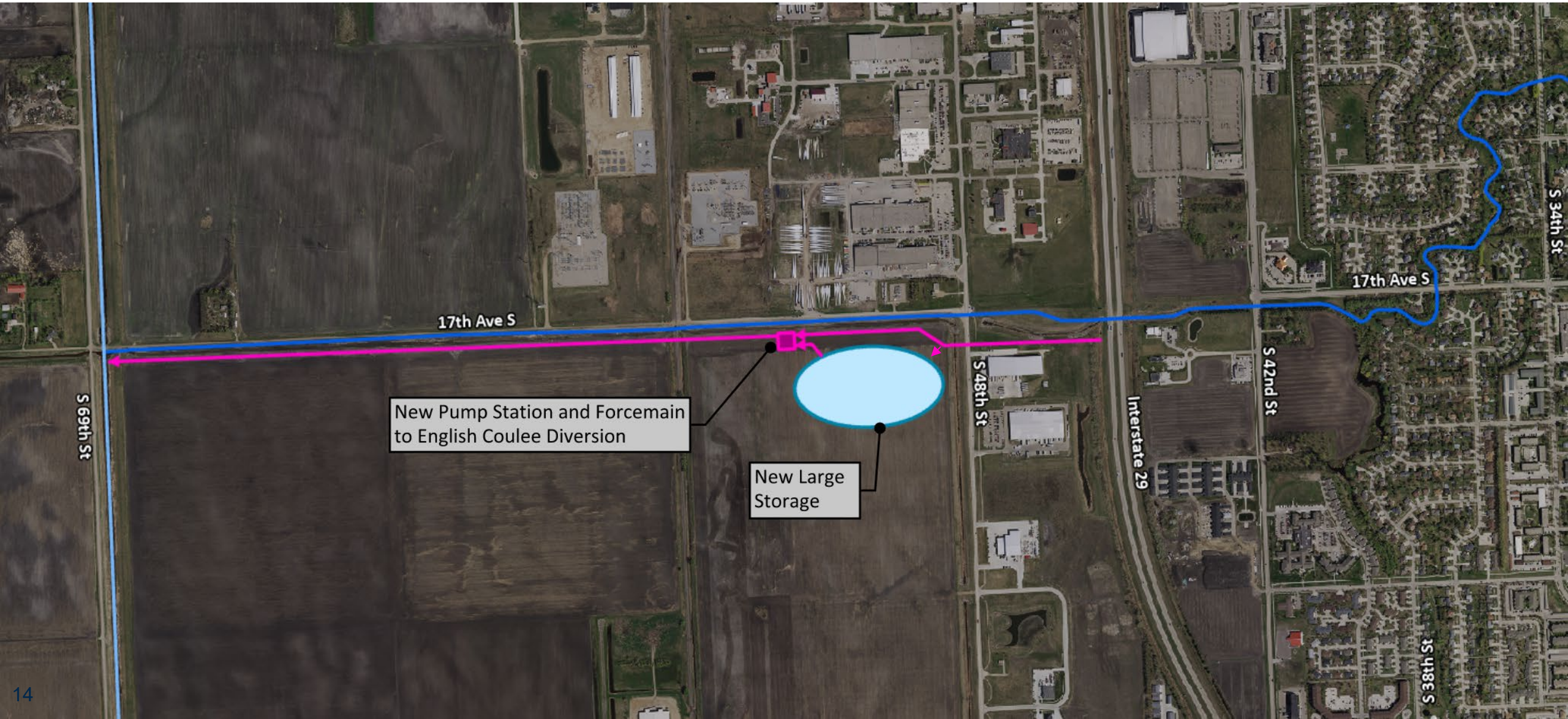
Pond Invert 821'

Overflow Berm @ 828.5'
(Existing Sidewalk + 1.5')

S 34th St

11th Ave S

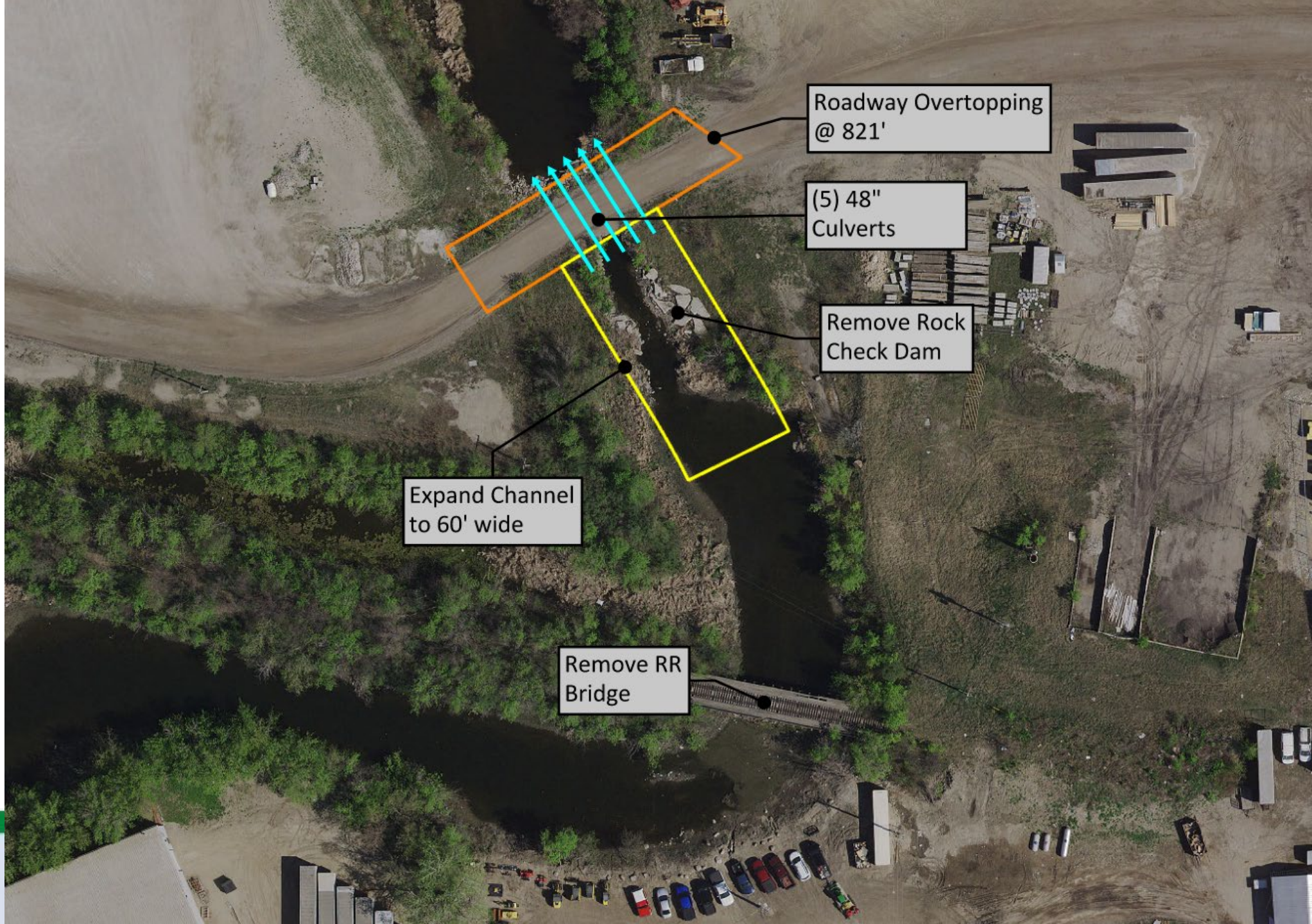
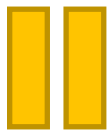
West of I-29 Large Storage (Lake)



New Pump Station and Forcemain to English Coulee Diversion

New Large Storage

Gateway Drive Industrial Frontage Road Crossing



Roadway Overtopping @ 821'

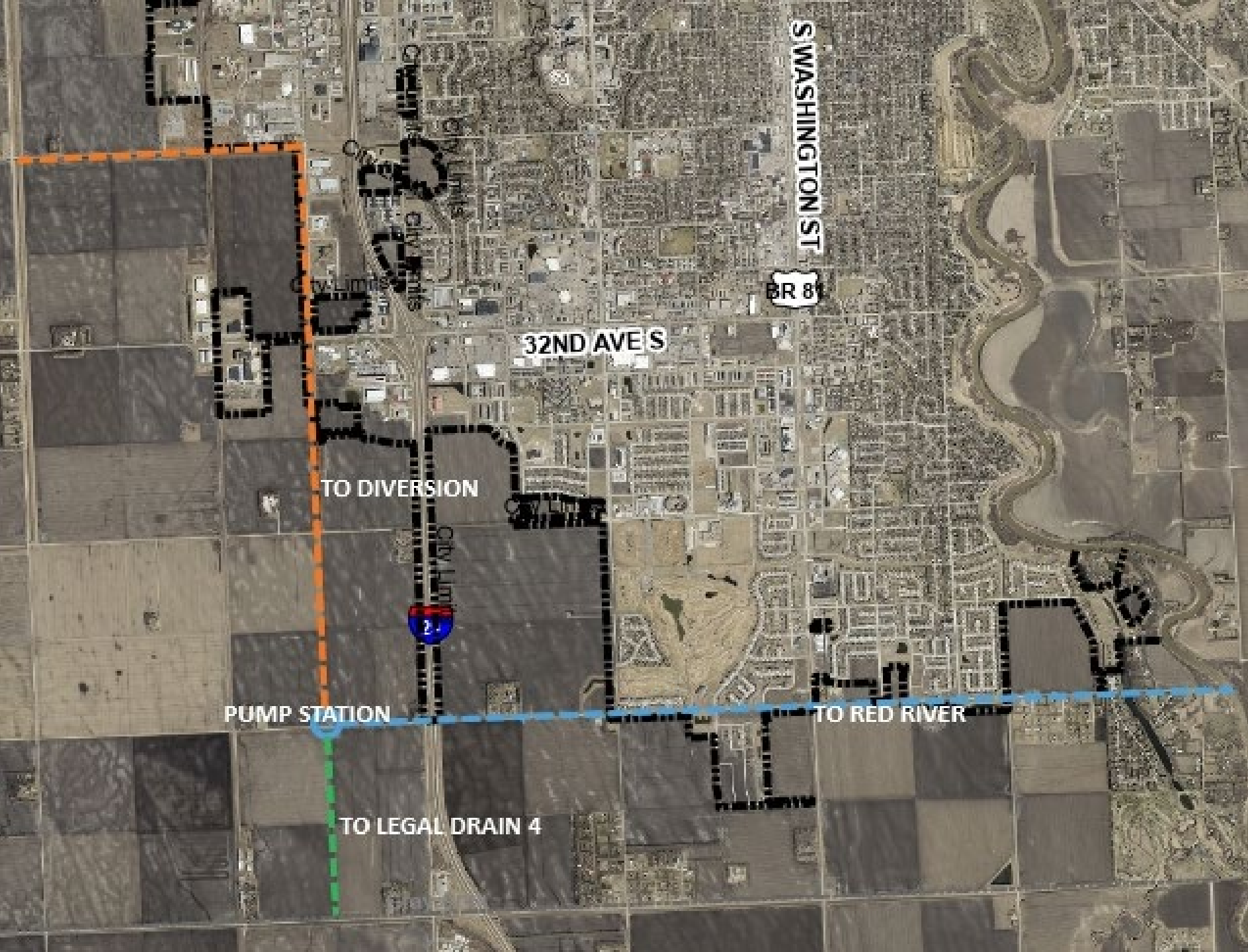
(5) 48" Culverts

Remove Rock Check Dam

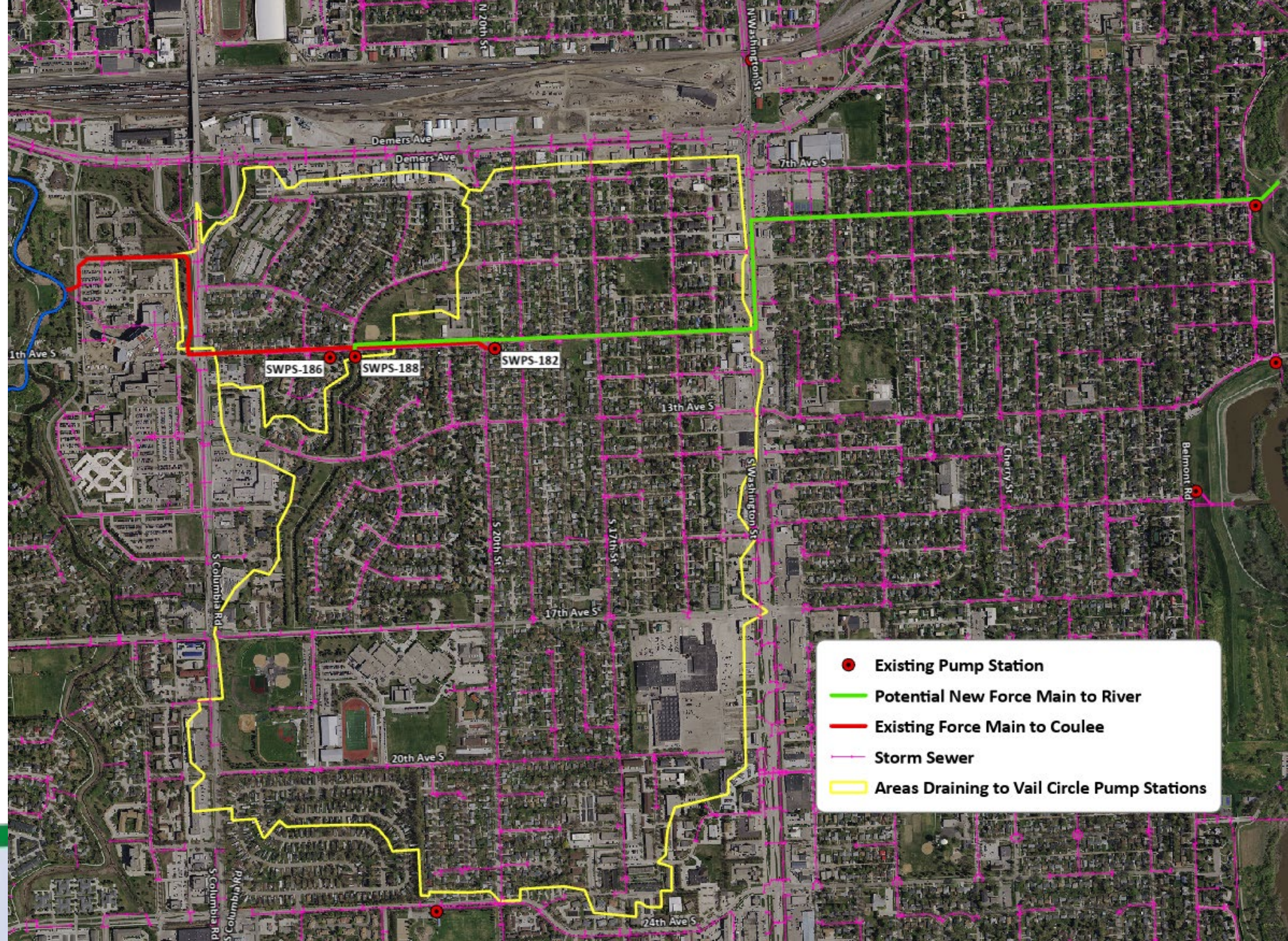
Expand Channel to 60' wide

Remove RR Bridge

West of I-29 Pump Station Options



Vail Cir Pump Station Reroute



Priority of Next Studies Table

Potential Solutions	Status	Considerations
S 48th St (W of I-29) Ditch*		Storage & future flexibility
PDA 3 Expanded Pond Storage*		New, increased storage standards. Likely a part of any combination of solutions
PDA 3 Direct Flows to Diversion*		Needs a sense of Corps acceptance
Disconnect Internal Drainage Areas		Smaller scale, isolated solutions
Outlet Improvements		Needs Corps acceptance and review
Large Storage @ 11th Ave S**		High impact to developable land, may not provide as much benefit as desired for the level of impact
11th Ave S Pump Station**		Cost and unknown level of need prior to implementing other solutions
Large West Side Storage (Lake)**		Relies on Corps approval of discharging additional water to English Coulee Diversion
English Coulee Channel Improvements		Multiple implementation complications
PDA 3 Direct Flows to Drain 4		Cost, unknown targets, integration with rural drainage
PDA 3 Pump Station @ S 48th St & 62nd Ave S to River		Develop concepts
Reroute Vail Cir. to Red River		Difficulty and cost

*Potentially part of a combined solution with others labeled similarly

**Potentially part of a combined solution with others labeled similarly

Priority of Future Actions

Early 2026 Actions

1. West of I-29 ditch & pond storage requirements determination & adoption
2. Army Corps 408 Review related to introducing new flows to English Coulee Diversion
3. English Coulee pump station upgrades (feasibility)
4. Install monitoring sites on major waterways contributing to drainage areas of interest (6 to 8 locations)

Late 2026/Early 2027 Investigations

1. Determine how to heavily control or eliminate west end flows from internal English Coulee drainage
 - Storage
 - Pumping
2. English Coulee single point of failure discharge plan
3. Determine how to disconnect English Coulee backflow areas if needed
4. Feasibility of multi-layered solutions

ND Department of Water Resources Cost-Share

Rural Flood Control (Drains, Channels, or Diversions)

Improve water management of runoff from agricultural sources and reduce flood-related impacts in rural settings. Assessment drains are eligible for up to 60%.

45% to 60%

Flood Protection Program

Support projects that prevent future damages related to flooding, including flood protection projects and related property acquisitions.

Up to 60%

City of Grand Forks Current Cost-Share:

- Adjusted based on rural (87%) vs. urban (13%) contributing area of the total study watershed area
- Current Cost-Share = $87\% \times 60\% = 52\%$

*Past/current cost shares may not be representative of future cost shares

Questions?

Water Surface Elevations

Location	1985 FEMA Effective Elevations (Pre-flood protection system)	Current Effective FEMA Elevations	Latest Modeled Elevations
11th Ave S (upstream)	832.6	828.76	830.76
Demers Ave (upstream)	832.1	827.96	830.21
Univ Ave (upstream)	829.6	825.96	827.95
6th Ave N (upstream)	829.6	824.6	826.52
Gateway Dr (upstream)	829.6	824.6	826.46
Outlet	829.6	824.6	826.37