White Bear Lake Area Comprehensive Plan Study 8

Stormwater Collection and Infiltration to Raise Groundwater Elevations
(Initial Evaluation)

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METROPOLITAN COUNCIL

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Scope of Study

- Review typical contaminants in stormwater runoff
- Review regulatory requirements related to protecting groundwater from stormwater contaminants
- Identify potential challenges, issues, concerns with stormwater collection and infiltration

Stormwater Pond Contaminants

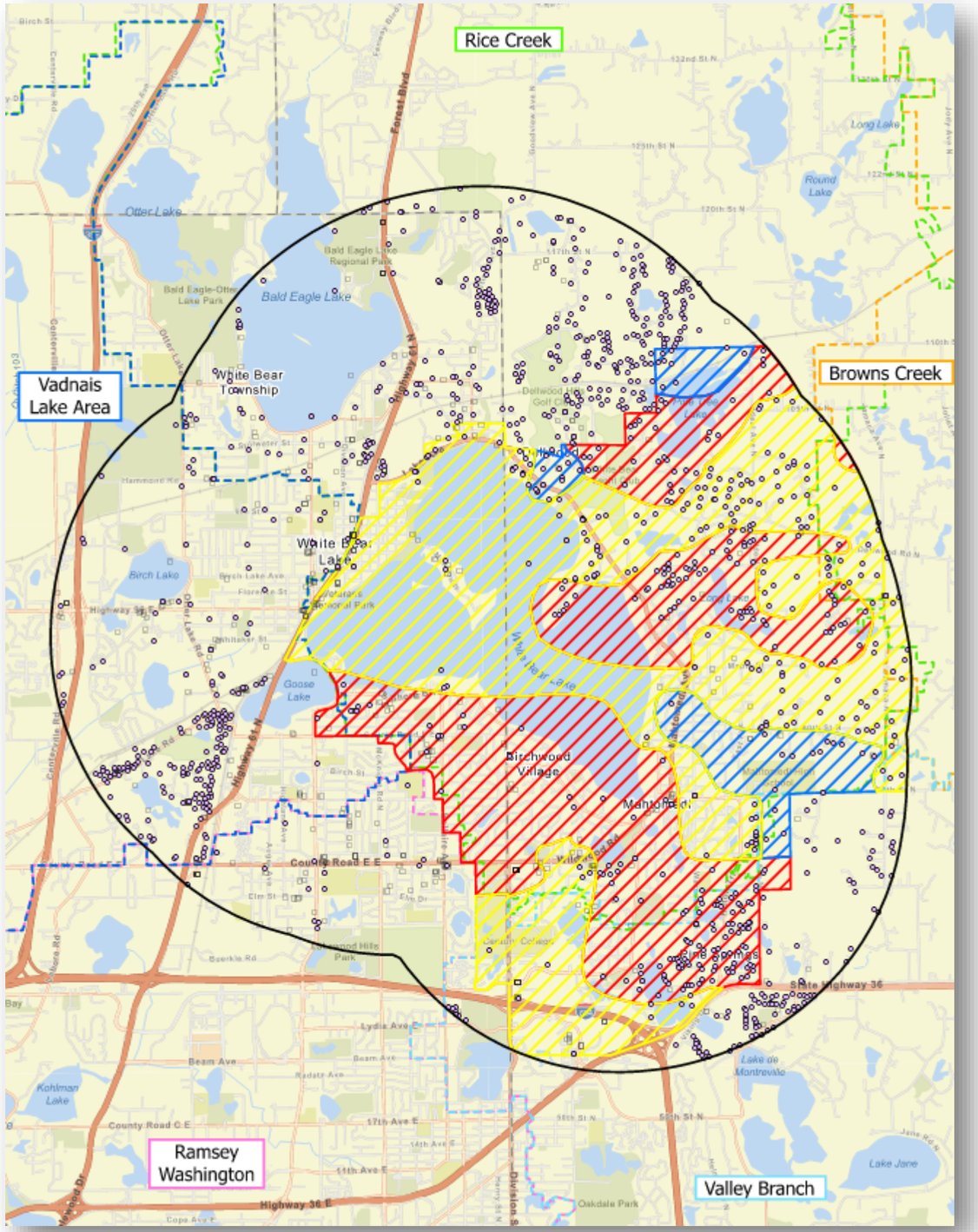
Pollutant	Sources	Potential Concerns	Mitigation Strategies
Nutrients (N, P)	Sediment, organic debris, fertilizer, animal feces, combined sewer overflows	Algae growth, microbial growth	Anoxic zone for denitrification
Organic Matter	Organic debris (leaves, twigs, etc.)	Decomposition causing low dissolved oxygen and odors	Infiltration
Suspended Sediment	Paved surfaces, bare soil, construction, stockpiles	Clogging intake/distribution, increased maintenance	Infiltration
Chlorides	De-icing and water softening chemicals	Corrosive to pipes, toxic to plants and fish. High GW risk.	No cost-effective treatment
Pathogens	Animal feces, insects, sewage overflows, waste management drainage	Risk to human health	Increase temperature, low soil Ph, finer clay soils
Metals	Vehicle exhaust, roofing materials, vehicle repair drainage	Toxic to plants and fish.	Infiltration
Organic Chemicals (pesticides, industrial chemicals, petroleum chemicals)	Drainage of sources of organics	Human/animal health risk, toxic to plants and fish.	Microbial degradation

Regulatory Considerations

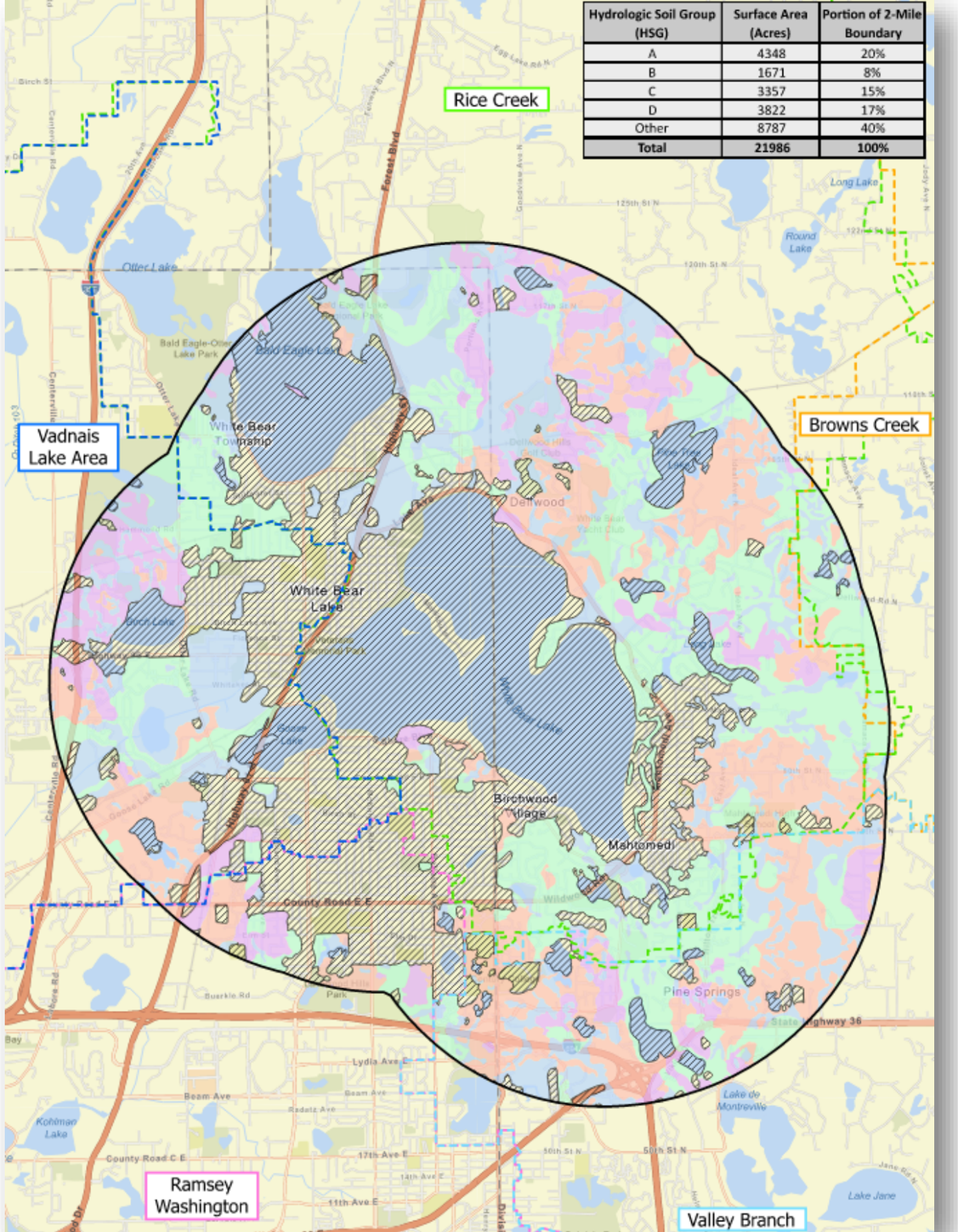
- NPDES Construction Stormwater Permit and MS4 Program Requirements
- Restrictions and Prohibitions on infiltration within certain Drinking Water Supply Management Area (DWSMA) vulnerability zones
    - High vulnerability areas will require higher level engineering review
    - High vulnerability ~ 20% of 2-mile boundary area
- Other state requirements – Class V injection wells
- No major challenges with stormwater infiltration given current regulations

DWSMA Categories

DWSMA Vulnerability Category	Surface Area (AC)	Portion of 2-Mile Boundary
None	11,245	51%
Low	823	4%
Moderate	5,537	25%
High	4,382	20%
Very High	0.0	0%
Emergency Response Area	0.0	0%
Total	21,987	100.0%



- High Vulnerability
  - South and East
- No Restrictions
  - North and West



Hydrologic Soil Group (HSG)	Surface Area (Acres)	Portion of 2-Mile Boundary
A	4348	20%
B	1671	8%
C	3357	15%
D	3822	17%
Other	8787	40%
Total	**21986**	**100%**

- Hydrologic Soil Groups
  - A – 20%
  - B – 8%
  - C – 15%
  - D – 17%
  - Other – 40%

Legend

2-mile Boundary

HSG
- A
- B
- C
- D
- Other

Watershed Districts
- Browns Creek
- Ramsey-Washington
- Rice Creek
- Vadnais Lake Area
- Valley Branch

Challenges, Issues, and Concerns

Drought Condition Considerations

- No significant challenges to function of infiltration systems
- Initial vegetation establishment can be difficult
- The need for additional infiltration of stormwater to recharge the aquifer and maintain elevations in White Bear Lake would likely be at its greatest during drought conditions when less stormwater would be available around the lake to infiltrate into the aquifer.

Study 8 (Initial Evaluation) Conclusion

- No major concerns with potential contaminants that are not already address by current regulations
    - No major issues or challenges to additional infiltration practices
- Quantifying benefits of more infiltration area(s) is a challenge
    - Within watershed drainage area – no new volume to capture
    - Outside watershed drainage area – efficiency of infiltration on regional groundwater table
- Drought can significantly reduce infiltration rates and provide less recharge to the aquifer when municipal pumping rates are usually at their greatest.

Questions