

Moorhead East Growth Area Alternative Urban Areawide Review (AUAR)

Final AUAR

Prepared for the
City of Moorhead, MN

By
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Introduction

An Alternative Urban Areawide Review (AUAR) is authorized under Minnesota Rules Chapter 4410.3610 as an alternative form of environmental review for development projects. Generally, the AUAR consists of one or more development scenarios, an inventory of environmental and cultural resources, an assessment of the “cumulative” impacts that the development scenarios may have on these resources as well as public infrastructure services, and a set of mitigation measures that reduce or eliminate the potential impacts generated by the development. The AUAR is intended to address the “cumulative” impacts resulting from a sequence of related development projects as opposed to an Environmental Assessment Worksheet (EAW) or Environmental Impact Statement (EIS) which simply looks at a single project’s impacts and does not attempt to outline mitigation initiatives.

An AUAR is used as a tool to help parties interested in development within the project area understand the existing environmental and cultural resources present on a site prior to initiating detailed planning and design. It is also used to identify key initiatives that must or should be undertaken to minimize negative impacts generated by proposed development.

AUAR Process Summary

City staff began exploring the concept of completing an AUAR for the project area in conjunction with a study of the East Moorhead Township growth area. The City of Moorhead expected that property owners and developers in the growth area would begin to explore development projects. Rather than evaluating projects individually, the City desired a comprehensive review of the potential impacts of full growth east of the city. The City hired a consultant to assist with the preparation of the AUAR. The process followed the statutory requirements for completion of an AUAR.

1. Project Title

East Moorhead Growth Area Plan

2. Proposer

Proposer City of Moorhead
Contact Kristie Leshovsky
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3. RGU

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4. Reason for AUAR Preparation

Over the past decade, the City of Moorhead has experienced an increase in development activity that has led to the need to plan for future growth. The City of Moorhead recognized the need for more detailed land use planning that would facilitate the development of multiple parcels in a cohesive manner and ensure that the public infrastructure needed to support development is planned appropriately. This AUAR is being prepared to evaluate the potential future growth and its associated impacts on a cumulative basis rather than on a piecemeal basis as individual projects require or conduct environmental reviews. This is a discretionary AUAR completed by the City of Moorhead.

5. Project Location

County: Clay County

City: Moorhead, MN

PLS Location ($\frac{1}{4}$, $\frac{1}{4}$, Section, Township, Range): Sections 11-15, Township 139N, Range 48W; Sections 18-19, Township 139N, Range 47W; Sections 23-24, Township 139N, Range 48W

Watershed: County Ditch #47 Minor Watershed and Upper Red River of the North (57)

GPS Coordinates: 46°50'27.6"N 96° 41'56.2W

Tax Parcel Numbers: Please refer to the map in the Appendix regarding tax parcels for East Growth Area

Attach each of the following maps to the AUAR: county map, USGS map, and a site plan. *AUAR Guidelines: The county map is not needed for an AUAR. The USGS map should be included. Instead of a site plan, include: (1) a map clearly depicting the boundaries of the AUAR and any subdistricts used in the AUAR analysis; (2) land use and planning maps as required in conjunction with items 9 and 27; and (3) a cover type map as required for item 10. Additional maps may be included throughout the document wherever maps are useful for displaying relevant information.*

All required maps and additional maps displaying relevant information are found in Appendix A.

6. Project Description

a. Provide a project summary of 50 words or less to be published in the EQB Monitor.

The City of Moorhead recognizes the need for more detailed land use planning that facilitates development in a cohesive manner and ensures that the public infrastructure needed to support development is planned appropriately. This AUAR evaluates the potential future growth and its associated impacts on a cumulative basis.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The project area encompasses over 4,000 acres in east Moorhead Township and the southern portion of the City of Dilworth. Total build out of the project area is not anticipated for over 20 years. This AUAR evaluates the potential full build-out scenario, as per the Growth Area Plan (GAP).

The full build-out by 2040 development scenario is evaluated in this AUAR. This scenario reflects the land use pattern described in the Moorhead Growth Area Plan (GAP). The GAP was developed to address the increase in development activity that has led to the need to plan for future growth. General directions for the GAP were established based on the City Comprehensive Plan (updated in 2009), stormwater plans, utility infrastructure plans, and regional transportation plan as provided by Fargo-Moorhead Metropolitan Council of Governments (Metro COG). The general public, city staff, affected property owners and the development community were integrally involved throughout the process providing input before alternatives were conceived and reviewing proposed alternatives to help converge on a preferred plan.

- 1) Development in the project area is not anticipated to involve the physical or hydrologic alteration of any existing surface waters; however, development could impact the Red River and its tributary streams if storm water runoff is not managed adequately.
- 2) There will be no modifications to existing equipment or industrial processes. Any and all existing equipment will be removed from the site and disposed of according to all applicable city, state and federal regulations.
- 3) At this time, the Proposer does not have plans to demolish, remove, or remodel any existing structures. However, should demolition occur, all construction wastes will be removed and disposed of off-site according to all applicable city, state and federal regulations.
- 4) At this time, the project area for Scenario 2 will be developed through the growth year of 2040, depending upon market conditions.

c. Project Magnitude

Total Project Acreage Approximately 4,313.50 acres

This AUAR will evaluate two development scenarios with varying magnitudes. Table 6-1 summarizes the development magnitude data for each Scenario.

Scenario 1: No Further Build. This scenario assumes that development in the East AUAR area would halt at its current state. Therefore, acreage and development intensity figures used in this AUAR represent the current status (at time of writing) of development in the East AUAR area. See Table 6-1 for currently developed acreage.

Scenario 2: Maximum Development. This scenario assumes that all land in the East AUAR area will develop to its maximum allowed intensity. The acreage figures for this scenario represent how the current AUAR area acreage is guided by the city. See Table 6-1 for guided acreages. The development intensity figures for Scenario 2 represent the maximum development that could occur in the East AUAR area based on the City's current land use and zoning controls.

Table 6-1: Acreage Assumptions of East AUAR Area Scenarios

Land Uses	Scenario 1: No Further Build (acres)	Scenario 2: Maximum Development (acres)
Residential	82.64	1,305.08
Commercial	60.06	104.33
Mixed Use	--	186.02
Industrial	0.00	742.87
Public/Semi-Public, Institutional	179.20	295.63
Parks & Open Space	20.57	69.82
Agricultural	3,678.71	1,284.25
Right-of-way	266.52	293.13
Open Water	25.80	32.38
Total	4,313.50	4,313.50

- d. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

The City of Moorhead has experienced an increase in development activity that has led to the need to plan for future growth. The City of Moorhead recognized the need for more detailed land use planning that would facilitate the development of multiple parcels in a cohesive manner and ensure that the public infrastructure needed to support development is planned appropriately. This is a discretionary AUAR completed by the City of Moorhead.

The project serves as a major development opportunity for the City of Moorhead. The development will increase housing options and availability and provide recreation

opportunities, hospitality and commercial services to the area. The City and the region will be positively impacted by the increased revenue and property taxes generated by development on the site, as well as enhancements to services, jobs, and recreational opportunities in the region. The project will mostly be completed by private developers.

e. Are future stages of this development including development on any other property planned or likely to happen? Yes or No.

No. The AUAR evaluates the full build-out of proposed development within the AUAR area. The area is planned to be developed continuously through the growth year 2040 in response to market demand.

Figure 7-1 depicts the land use from the 2009 Comprehensive Plan, which represents the site at full build-out.

f. If yes, briefly describe the past development, timeline and any past environmental review.

Not applicable.

7. Cover Types

Land cover in the AUAR area was determined based on the 2011 National Land Cover Database (NLCD). The NLCD is a database which assesses national land cover changes and trends across the US from 2001 to 2011. The system categorizes open and developed areas in terms of land cover, rather than land use, using a 16-class land cover classification scheme. This AUAR categorizes land cover boundaries based upon the NLCD.

Table 7-1 (Pre- and post-construction land cover types for the AUAR area under the full build-out scenario) provides a summary of land cover types currently in the AUAR area and estimated post-construction land cover as a result of planned development. Table 7-1 is based on the NLCD data and GIS tools (Figure 7-1). Estimated post-construction land cover types were calculated by overlaying the Growth Area Plan (Figure 7-1) on the NLCD data (see Figure 7-2).

Table 7-1: Land Cover Type Assumptions of East AUAR Area Scenarios

Land Cover Type (determined through NLCD data)	Scenario 1: No Further Development		Scenario 2: Maximum Development	
	Total Acres	Percent of AUAR Area	Total Acres	Percent of AUAR Area
Deciduous Forest	16.91	0%	12.55	0%
Evergreen Forest	--	--	--	0%
Grassland/Herbaceous	--	--	--	0%
Pasture/Hay	--	--	--	0%
Cultivated Crops	3,610.98	84%	1,220.12	28%
Woody Wetlands	--	--	--	0%
Open Water	25.80	1%	32.38	1%

Land Cover Type (determined through NLCD data)	Scenario 1: No Further Development		Scenario 2: Maximum Development	
	Total Acres	Percent of AUAR Area	Total Acres	Percent of AUAR Area
Developed land, <11% to >90% impermeable ^a	659.81	15%	3,048.46	71%
Total ^b	4,313.50		4,313.50	

^a Post-construction values reflect NLCD data and new impervious areas (e.g., buildings, parking lots, etc.) per the GAP.

^b Totals reflect actual values and do not account for rounding error within the table.

Per the NLCD User Manual¹, descriptions of the land cover types illustrated on the figures and tables within this Question 7 are summarized in Appendix B.

Based upon the current GAP, cultivated crops will be the primary NLCD land cover type (not previously developed or an impervious area) that will become developed in the East AUAR area (i.e., impervious surface or maintained grasses) as a result of full build-out development (Table 7-1).

Based upon NLCD data, the East AUAR area does not contain any woody wetlands; however, the National Wetland Inventory (NWI) has been more recently updated than the NLCD data, and provides more accurate wetland and stormwater pond coverage within the AUAR area. It is anticipated that impacts to these wetlands will be minimal, as it is expected that the developers will avoid impacting these areas to the greatest practicable extent.

The NLCD methodology separates land cover types into three categories: natural, semi-natural, and cultural. Natural land cover types are more likely to contain potential suitable habitat for rare wildlife and plant species than previously disturbed areas that may contain artificial surfaces and/or invasive species (i.e., semi-natural and cultural). Existing natural land cover accounts for approximately 1% of the total AUAR area. While there are natural land cover types within the AUAR area, and the acreages of these areas are predicted to decrease with full build-out based on Table 7-1 above, it is important to note that the change in land cover does not necessarily equate with full loss of these areas. It is anticipated that the City will avoid impacting natural areas, if possible. Where impacts cannot be avoided, it is expected that post-construction land cover will include created natural areas, such as landscaped areas, parks, and open space.

It is anticipated that the full build-out of the AUAR area actually will result in similar post-construction land cover totals, since preservation of open water, wetlands, and other natural habitat types are generally a priority in development planning.

¹ NLCD. 2011. Homer, C.G., et al., 2015, [Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information](#). *Photogrammetric Engineering and Remote Sensing*, v. 81, no. 5, p. 345-354

8. Permits and Approvals Required

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Table 8-1 lists all permits that may be required for development in the AUAR area.

Table 8-1: Anticipated Permit Requirements

Unit of government	Type of application
Federal	
US Army Corps of Engineers	Clean Water Act Section 401/10 Wetland Permits (Joint Application for Activities Affecting Water Resources in Minnesota)
Federal Avian Administration	FAA 7460-1 Permit
State	
Clay County Soil and Water Conservation District	Joint Application for Activities Affecting Water Resources in Minnesota
Minnesota State Historic Preservation Office	Cultural Resource Coordination
Minnesota Department of Transportation	Utilities in Right-of-Way Permit
	Right-of-way permit for work within or affecting MnDOT right-of-way
	Limited Use Permit
Minnesota Department of Health	Water Main Plan Review
Minnesota Pollution Control Agency	NPDES General Permit for Construction
	Sanitary Sewer Extension Permit
	Clean Water Act Section 401 Water Quality Certification required if a US Army Corps of Engineers Clean Water Action Section 404 Permit is required
	Notification of Intent to Perform a Demolition
	UST Notification of Installation or Change in Status Form

Minnesota Environmental Quality Board (EQB)	Environmental Assessments (AUAR)
Regional/Local	
City of Moorhead	Subdivision Approval
	Rezoning
	Planned Unit Development Approval
	Flood Fringe and Floodway Overlay Subdivision
	Conditional Use Permit Approval
	Grading/Erosion Control Permit
	Site Plan Review Approval
	Comprehensive Plan Amendments
	Zoning Ordinance Amendments
	Variance
	Floodplain Development Permit
Clay County	Roadway Access Permit
	Utilities in Right-of-Way Permit
Buffalo-Red River Watershed District	Watershed Permit

9. Land Use

a. Describe:

- i. **Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.**

Land within the East Growth Area is almost entirely agricultural or vacant in use. There are some single-family residences along main roadways in the area, especially along 50th Street South and 12th Avenue South. There are three commercial areas nearby the East Growth Area, two along Interstate 94, in the far eastern part of the City (Sanford Medical Campus) and one east of the airport along Highway 336 (Titan Machinery). There is one park and natural wetland just west of the Growth Area, associated with a single and multifamily housing development along 40th Street South, in the far eastern part of the City. The Moorhead Municipal Airport is located southeast of the East Growth Area.

Figure 9-1 illustrates existing land use in the East Growth Area.

- ii. **Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a**

local, regional, state, or federal agency.

In 2009, the City of Moorhead updated their Comprehensive Plan to determine how the City will grow into the future. As part of this Plan, the City identified future land uses throughout the City and in the East Growth Area. The Growth Area is planned to be a combination of residential, commercial, and public uses. Residential uses will include a range of housing options from low-density homes (within the interior of the growth area) to medium and high-density homes along 12th Avenue South and adjacent to commercial uses. Commercial uses are guided to be located along Interstate 94. There will be six new park and open space elements within the growth area to serve nearby residential neighborhoods. Other park and open space development will occur around the Growth Area as residential development occurs.

Figure 9-2 illustrates the planned future land use in the East Growth Area.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

Zoning within the East Growth Area is complicated because of the many jurisdictions located within the area. For property within the City of Moorhead, land is generally zoned LI Light Industrial and HI Heavy Industrial south of Interstate 94. North of Interstate 94, there is a mix of low-density residential (RLD2 and RLD3), P Public Open Space, I Institutional, and RC Regional Commercial. The remainder of the land is zoned TZ Transitional.

Parts of the East Growth Area that are outside the City of Moorhead are under the jurisdictional authority of Clay County. Land within the East Growth Area is zoned AG General west of 60th Street S. Between 60th Street South and Highway 336, land is zoned Highway Commercial.

Figure 9-3 illustrates existing zoning in the East Growth Area.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

In 2016, the City of Moorhead adopted a Growth Area Plan (GAP) for the East Growth Area (Figure 7-1). This plan identified future land uses in this area. Much like the adopted Comprehensive Plan, the Growth Area Plan identifies a mix of low, medium, and high density residential throughout the central part of the East Growth Area, with commercial properties along Interstate 94. Future parks and a new institutional use are also located within these residential neighborhoods. Light and Heavy Industrial areas are planned for south of Interstate 94.

However, there are some areas in which this Growth Area Plan diverges from the Comprehensive Plan. For example, this GAP identifies neighborhood commercial uses at the intersections of 50th Street South and 12th Ave South and 55th Street South and 12th Avenue South. Additionally, along Interstate 94, east of the Moorhead city limits, the GAP

proposes mixed use development with two new parks to provide open space amenities and manage storm water.

Despite these differences between the City's adopted Comprehensive Plan and the East Growth Area Plan, the proposed GAP is consistent with the goals of the Comprehensive Plan:

- “1. Identify an efficient and logical system of major roadways to connect growing areas with community destinations;
2. Establish a comprehensive network of parks and open spaces to serve future residents by providing active and passive recreation areas, community amenities, and trails to connect neighborhoods;
3. Identify a system and strategies for storm water management that will serve as an asset and amenity for future neighborhoods while performing the needs of managing increased storm water runoff due to new development.”

The organization of the GAP, with residential uses north of Interstate 94, commercial uses along the highway, and industrial uses to the south, is generally consistent with existing zoning within the city limits with some variation between parcels. However, this GAP is inconsistent with zoning for agricultural uses and regional commercial uses for land within Clay County.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Required Changes to the Comprehensive Plan:

For the East Growth Area Plan to be consistent, the City must adopt the plan into their Comprehensive Plan.

Required Changes to Zoning:

Given that the proposed future land use in the East Growth Area is only generally consistent with existing zoning, the City must update their zoning map to accurately implement this revised future land use plan.

As new land within the East Growth Area is annexed into the City of Moorhead, the City must update its zoning map to reflect the residential and mixed use nature of the proposed future land use.

10. Geologic Hazards and Soil Conditions

- a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.**

Surface geology over the majority of the project area is comprised of Wisconsinan Episode glacial deposits associated with glacial Lake Agassiz. These deposits are fine-grained lake sediments comprised of clay, silty clay, and silt.

Depth to bedrock across the project area ranges from 250 to 300 feet in depth, as observed in local well logs, with an average depth of approximately 285 feet. The uppermost bedrock units are granite or granodiorite intrusive rocks. No carbonate bedrock is known to exist within the project area, making the risk of karst features to be extremely unlikely.

The water supply aquifers in the area are separated from the land surface by multiple layers of clay and sandy clay deposits. The sensitivity of these aquifers to activities at the land surface is fairly low. The greatest risk posed to the aquifer is from contamination that infiltrates through wells that are not properly constructed or through unused wells that are not properly sealed.

No other geologic hazards were identified.

- b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.**

Soils in the project area are either part of the Fargo Association or the Bearden-Colvin Association. Figure 10-1 and Table 10-1 show the NRCS soil classifications for the project area. The Bearden-Colvin soils can be somewhat problematic for development, with a higher potential for wetness due to poor drainage characteristics. These soils are not suitable for infiltration or for septic drain fields. There is a potential for perched groundwater conditions to exist where groundwater lies on top of clay-rich soils or geologic deposits.

Table 10-1: Soil Types in the AUAR Area (East)

Map Unit Symbol	Map Unit Name	Hydrologic Soil Group	Percent of Area
I5A	Borup loam, 0-1% slopes	B/D	0.2%
I119A	Bearden silty clay loam, 0-2% slopes	C	13.1%
I129A	Croke very fine sandy loam, 0- 2% slopes	C	0.5%
I130A	Hegne-Fargo silty clays, 0-1% slopes	C/D	0.4%
I170A	Swenoda loam, 0-3% slopes	B	0.0%
I229A	Fargo silty clay, 0-1% slopes	C/D	1.5%
I233A	Fargo silty clay loam, 0-1% slopes	C/D	10.9%
I235A	Fargo silty clay, depressional, 0-1% slopes	C/D	1.0%
I312A	Wyndmere fine sandy loam, 0-2% slopes	B	0.8%

I376A	Colvin silty clay loam, 0-1% slopes	C/D	22.0%
I377A	Wheatville silt loam, 0-2% slopes	C	3.1%
I383A	Overly silty clay loam, 0-2% slopes	C	2.5%
I467A	Bearden silt loam, 0-2% slopes	C	31.4%
I507A	Glyndon loam, 0-2% slopes	C	1.0%
I627A	Bearden-Fargo complex, 0-2% slopes	C	1.5%
I641A	Fargo silty clay, silty substratum, 0-1% slopes	C/D	2.1%
I646A	Viking clay loam, 0-1% slopes	D	1.8%
I901A	Urban Land-Aquerts complex, 0-2% slopes		1.8%
I906F	Orthents-Aquerts-Urban Land, highway complex, 0-35% slopes	C	4.3%

Erosion potential across the project area is low, with no steep slopes present to facilitate erosion. Additionally, soils have low strength, are susceptible to shrink-swell, and are corrosive to metals. These soils are generally poor for building roads, and are not suitable for basements.

MITIGATION STRATEGIES

If shallow groundwater or wet soils are encountered that require dewatering in excess of 10,000 gallons per day or 1 million gallons per year, a DNR water appropriation permit will be required before dewatering can begin.

Individual homes with basements should have sump pumps and granular backfill, and lots should be graded to properly drain. For roads, geotextile should be utilized to add strength, and a granular base should be used to add strength and drainage. Use of drain tiles should also be considered. Use of metal pipes should be avoided where possible. Exposed metal should be wrapped with polywrap to limit exposure and reduce corrosion.

11. Water Resources

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

- i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.**

Surface waters in the project area are shown on Figure 11-1. There are no DNR Protected Waters within one mile of the project area. The Red River of the North is the

only MPCA 303d-listed impaired water in the vicinity, located approximately three miles west of the project area. The Red River is impaired for aquatic consumption (due to PCBs and mercury in fish tissue) and aquatic life (due to turbidity). There are no shoreland areas in the project area. The development in the project area is outside of the 100-year floodplain.

Surface water generally flows north and west to the Red River via County ditches. The study area contains County Ditch No. 41 and a small portion of County Ditch No. 47. There are several planned stormwater ponds in the southern portion of the study area, generally discharging to County Ditches No. 41 or No. 47.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

The chief water supply aquifer consists of buried sand and gravel deposits overlain by a thick layer of clay and sandy clay. The overall sensitivity of the aquifer to pollution is relatively low due to these clay deposits.

- 1) Depth to groundwater:** Depth to groundwater within the project area ranges from 12 feet to 180 feet in the wells observed within the area. Average groundwater depth is 70 feet. However, since low permeability soils and clay deposits exist in the area, there is a potential for perched groundwater to be present at or near the land surface over portions of the project area.
- 2) MDH wellhead protection area:** The eastern edge of the project area, near Highway 336 overlaps with a portion of the Drinking Water Supply Management Area (DWSMA) for the Moorhead-Buffalo aquifer. This DWSMA has been classified as “vulnerable” to contamination from spills or leaks that occur at or near the land surface. This is either due to the clay layers not being laterally extensive across the DWSMA to afford protection, or the presence of human-sourced contamination has been detected in the aquifer. In the area, best management practices should be undertaken to avoid spills or leaks infiltrating into soils. The City of Moorhead Wellhead Protection Plan should be used to reference protective measures to be undertaken in this area.
- 3) The following wells were identified on the property:** A total of 30 groundwater wells have been identified within the project area using the County Well Index database. See Figure 11-2 and Table 11-1. Most of these wells are for domestic use, but there are also some test wells, public supply wells, and US Geological Survey investigation wells within the area. One of the wells is reported to be sealed, with seven other wells listed as having an “unknown” or “inactive” status. The actual number of wells within the project area is likely to be greater, since not all wells have been accounted for in the State’s database, especially any wells drilled prior to 1975 before the State started collecting well records. Improperly constructed wells, or unused wells which haven’t been sealed, can act as a pathway for

contaminants to reach the aquifer. Therefore, Well Code requires that unused wells be sealed by a licensed well contractor. If any unused wells are encountered during construction activities, or if any wells are taken out of service during the course of construction, these wells must be sealed to meet the Well Code.

Table 11-1: County Well Index

Unique Number	Well Name	Depth (feet)	Static water level (feet)	Aquifer	Well type	Listed status
138861	Golberg, Max	220			Test well	Unknown
222091	Kordosieur, Tony	192	110	QBAA	Domestic	Active
268364	Titan Machinery #1	0			Public supply	Inactive
764292	Miller, Don & Fern	102	40	QBAA	Domestic	Active
445120	Christman, Steve	223	179	QBAA	Domestic	Active
222088	Fargo-Moorhead Koa Tw2	312			Test well	Unknown
571309	Moorehead Muni. Airport	70		QBAA	Public supply	Active
409229	Tobolt, John	85	23	QBAA	Domestic	Active
222086	Fargo-Moorhead Kamp Group	262	60	QBAA	Domestic	Active
222090		230	19	QBAA	Domestic	Active
222089	Fargo Moorhead Koa Tw1	357			Test well	Active
244685	USGS 77-54	97			Investigation	Sealed
222087	Fargo-Moorhead Koa Tw3	147			Test well	Unknown
228717	Usgs 56-6	100			Investigation	Sealed
1000001436	Mueller	0			Domestic	Active
516292	Mazour, Craig	261	20	QBAA	Domestic	Active
744996	Dealer Sites	125	17	QBAA	Domestic	Active
138863	Goldberg, Max	255			Test well	Unknown
102633	Olson, Duane	281	19	QBAA	Domestic	Active
191596	Bakke, Randy	188	127	QUUU	Domestic	Active
244686	USGS 77-55	127			Investigation	Unknown
463949	Tobalt, John	168	135	QBAA	Domestic	Active
558055	Mn Dept. Of Transport.	298	31	QBAA	Domestic	Active
527491	Koa Kampground	271	106	QBAA	Public supply	Active
536549	Peterson, Gary	192	123	QBAA	Domestic	Active
516291	Kreps, Steve	224	31	QBAA	Domestic	Active
614961	Staiger, David	175	65	QBAA	Domestic	Active
704434	Halvorson, David	170	118	QBAA	Domestic	Active
733055	Niemi, Dale	268	12	QBAA	Domestic	Active

138862	Golberg, Max	120			Test well	Unknown
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MITIGATION STRATEGIES

1. If shallow groundwater or wet soils are encountered that require dewatering in excess of 10,000 gallons per day or 1 million gallons per year, a DNR water appropriation permit will be required before dewatering can begin.
2. Construction activities that fall inside the DWSMA for the Moorhead-Buffalo aquifer should follow best management practices to mitigate risks of spills or leaks. Activities should also comply with the City of Moorhead's Wellhead Protection Plan.
3. Any unused wells that are encountered in the project area should be sealed using a licensed well contractor.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

- i. **Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.**
 1. **If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.**
 2. **If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.**
 3. **If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.**

The City of Moorhead completed a Sanitary/Storm Water Master Plan for this area in 2006. This plan was updated in 2007, and investigated the future sanitary sewer needs in some of the area covered in this AUAR. In 2015, an additional Study was implemented to evaluate some of the area that is covered under this AUAR. That document is currently in draft form and is available for review through the City of Moorhead Engineering Department. It is anticipated that the document will be finalized shortly. The majority of the eastern portion in this AUAR is undeveloped, so construction of trunk sewer facilities in this AUAR area is readily achievable. The western portion of this AUAR is currently under development and sanitary sewer is either installed or planned. Future expansion of this East AUAR area requires that sanitary sewer flows be conveyed to the City's Wastewater Treatment Facility (WWTF), which is located on 28th Street North, just north of 15th Ave. North.

Since this AUAR is located in the eastern portion of the City, the conveyance facilities must go through either the existing East Side Trunk Sewer Facilities, or find a new route to the WWTF. This new route would most likely be around Dilworth.

A layout for the portion of the AUAR that can be served through the East Side Trunk Sewer Facilities is shown on Figure 11-4. A portion of this Figure shows trunk facilities coming from a portion of the South AUAR. For the East Side, Figure 11-4 shows two lift stations, associated forcemains, and trunk gravity sewer from the development area to existing Lift Station No. 38. Lift Station No. 38 would need to be expanded to accommodate this increased flow. Lift Station No. 38 pumps to Lift Station No. 39, which would also need to be expanded to accommodate this additional flow. The analysis behind the system layout was conducted using two phases. These two phases were established by considering anticipated construction based on an expected logical progression of growth. Average wastewater flows were allocated to each different land use proposed as shown in Table 11-3 below. The expected wastewater flows for each land use subarea are available in the current draft report available for review from the City of Moorhead Engineering Department.

Table 11-2: Average Wastewater Flows by Land Use

Land Use	Flow Allocation
Low Density Residential	300 gallons per unit per day
Medium and Mixed Density Residential	225 gallons per unit per day
High Density Residential	200 gallons per unit per day
Commercial	1500 gallons per acre per day
Industrial	2000 gallons per acre per day
Parks and Public Use	200 gallons per acre per day

With the strategies employed on Figure 11-4, the proposed sanitary sewer system is projected to be able to serve approximately 45% of the flow that is anticipated to be generated by this AUAR area. A new trunk sewer system will need to be designed to serve the balance of the area covered in this AUAR. Based on the geography of the area, it may be most feasible to convey the flow generated in the south and east portions of the AUAR to Hwy 336 and then route them north around the City of Dilworth. For the 525 acres north of 12th Ave. South and east of 45th Street South, it may be most feasible to route the flows either through Dilworth or along the southwest edge of Dilworth. All flow would be conveyed north and west to the existing Moorhead WWTF. These improvements are anticipated to be more than ten years into the future.

All wastewater in the City of Moorhead is transported to the WWTF. The WWTF is currently operating under its wet weather design capacity of 9 million gallons per day (MGD). However, in order for this area to be completely developed, a major expansion to the WWTF will be needed. Based on the City's anticipated growth rate, expansion will not be needed for the next 10 years.

MITIGATION STRATEGIES

The City of Moorhead will monitor the wastewater system to determine when additional improvements are needed and will continue to update its capital budget to plan accordingly for these investments. Through the site development plan review process, the City of Moorhead will monitor and verify estimated wastewater flows for general conformance to current draft Sanitary/Storm South and East Area Master Plan. Each development will be responsible for 1) Sanitary sewer connection fees related to their proposed development; 2) Proportional share of the costs of the Trunk Sanitary Sewer Components; 3) Construction of local sewer components to serve the development; and, 4) MPCA/NPDES sanitary sewer extension permits.

- ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.**

Surface waters in the project area are shown on Figure 11-1. Surface water generally flows north and west to the Red River via County ditches. The study area contains County Ditch No. 41 and a small portion of County Ditch No. 47.

Existing conditions largely consist of agricultural land use, with little structural stormwater management. Development in the project area is anticipated to increase stormwater runoff due to the increase in impervious surfaces associated with urban land uses. Under proposed conditions, a stormwater system will be implemented to address local, state, and federal requirements, as discussed below. This system will generally consist of stormwater ponds for rate control and water quality treatment; infiltration, filtration, or bioretention for volume control and water quality treatment where feasible in accordance with City code and MPCA permit requirements; and temporary erosion and sediment control features such as vegetative restoration, storm drain inlet protection, construction entrance protection, and silt fence.

Where possible, the City's Growth Area Plan (GAP) encourages stormwater to be kept on the surface and treated on-site to reduce expensive stormwater system costs, subject to site limitations. In some cases, regional stormwater treatment may be more effective. The GAP also encourages the stormwater system to be integrated with the open space system to create a valuable amenity for neighborhoods. The GAP illustrates how landscape corridors and parkways can meander through neighborhoods and contain stormwater systems.

There are several planned stormwater ponds identified in the City's Storm Water Master Plan for the study area, generally discharging to County Ditches No. 41 or No. 47, as shown on Figure 11-1.

Development within this area is subject to the regulations of Chapter 8 – Storm Water Management of Title 3 – Public Health and Sanitation of the City Code. The City Code incorporates the design standards in the Minnesota Stormwater Manual and NPDES Construction Site Permit by reference. The Code calls for no increase or a reduction from pre-project conditions for stormwater volume, total suspended solids, and total phosphorus (subject to site-specific limitations and/or prohibitions), as well as for peak flows for the 2-, 10-, and 100-year storm events.

Additionally, stormwater will need to be managed in accordance with the City's NPDES MS4 Stormwater Permit and SWPPP, Construction Site Stormwater Permit, and (for industrial sites) Industrial Stormwater Permit, as well as the requirements of the Buffalo-Red River Watershed Management District. These plans, codes, and permits provide requirements for rate control, water quality treatment, and volume control. They address both temporary and permanent stormwater management.

- iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.**

Moorhead Public Service (MPS), a municipally-owned entity, will be the source of water for the developed area. The current firm capacity of the MPS system is 11.0 MGD (million gallons per day), using three different water sources. These sources are the Red River, the Moorhead Aquifer, and the Buffalo Aquifer. Well water from the Moorhead and Buffalo aquifers supplies 5.6 MGD of the current capacity, with the Red River supplying the remain 5.4 MGD. Current water usage is approximately 5.0 MGD, with a peak demand of 9.0 MGD during summer months.

Development of the project area is anticipated to increase water demand by 6.9 MGD for average daily demand, with an estimated additional peak demand of 17 MGD. Therefore, the system will ultimately need to provide for an ultimate demand of 26 MGD to satisfy peak demands. Development of other portions of the City may additionally increase daily demands on the system, requiring further appropriations of surface water and groundwater to meet these demands.

The Moorhead Aquifer has historically provided groundwater to the community, but is limited in its yield due to a low recharge rate. Water levels in the Moorhead Aquifer have dropped over the past century due to continued pumping. Additional water supply needs will therefore be more dependent on the expansion of pumping from the Buffalo Aquifer and the Red River.

The Buffalo Aquifer receives a higher amount of recharge than the Moorhead Aquifer and is therefore a more sustainable source of groundwater for the coming decades. MPS, with cooperation from the DNR, has developed the Buffalo Aquifer Management Plan to help guide usage of this aquifer for future needs, especially during drought periods where the aquifer will be heavily relied upon to meet most of Moorhead's water supply needs. The plan outlines a monitoring approach to identify drought stages and provides appropriate responses to address each stage of drought that include potential water demand reductions and demand reduction actions.

MPS is planning to construct an additional well field in the Buffalo Aquifer capable of producing an additional 5.0 MGD by the year 2027. Expansion of the Red River water treatment plant is the other option for increasing water supply capacity. Assuming the Buffalo Aquifer produces an additional 5.0 MGD by 2027, the Red River may be required to supply the additional 10 MGD to meet the anticipated peak demands.

Expanding the water supply system to further utilize the Buffalo Aquifer and the Red River will require an amended Water Appropriations Permit from the Minnesota DNR. As part of this permitting process, an investigation into any possible environmental impacts of the groundwater or surface water withdrawals will need to be undertaken. At present, there are no known negative impacts identified other than the reduction in water levels of the Moorhead Aquifer. Further study will be required to demonstrate that proposed future water withdrawals will be sustainable without negatively impacting natural resources or other well owners in the vicinity.

Expansion of the water supply system will also require an expansion of the water distribution system in order to pipe water to the project area. Additional water storage may also be required in order meet peak demands.

If temporary dewatering of shallow groundwater is required as part of the project activities, and is expected to exceed 10,000 gallons per day or 1 million gallons per year, then a separate Minnesota DNR Water Appropriations permit will be required before undertaking dewatering. Any temporary dewatering activities are not expected to have an impact on nearby groundwater wells (either private or municipal).

No specific wells have been identified for abandonment as part of the project activities. As existing properties are redeveloped, however, there is a likelihood that wells on these properties may be sealed as part of those redevelopment activities. Potential wells that could be impacted are identified in Table 11-2. Other wells that are not identified in Table 11-2 may also exist within the project area if they are not accounted for in the State's database.

MITIGATION STRATEGIES

Expansion of the MPS water supply system will be required to meet anticipated water demands for the built-out project area. Expansion of the system will require

appropriations of water from the Buffalo Aquifer and/or the Red River. The Buffalo Aquifer Management Plan will be used to guide future development of wells in the Buffalo Aquifer, along with management of pumping rates. A Minnesota DNR Water Appropriations permit will be required to utilize new (or expanded) sources of water. Depending on the actual number of wells that are required and the future water demands, the permitting process will identify any additional mitigation measures needed to protect natural resources or other water supply users. Additional mitigation strategies may include additional monitoring of aquifer levels, instituting more preventative water conservation measures, and working with the DNR to predict aquifer sustainability.

If current water resources are unable to meet anticipated water demands, more aggressive water conservation and reuse will need to be implemented, including (but not limited to) temporary water sprinkling bans during peak demand periods and the use of stormwater for irrigation to reduce demands on the aquifers.

Any wells abandoned during the course of project development or redevelopment will need to be sealed according to Minnesota Well Code by a licensed well contractor.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

There are approximately 13 acres of wetlands within the AUAR area (Figure 11-3). Any wetlands within the AUAR area are under the jurisdiction of the USACE and the Wetland Conservation Act (WCA). Additionally, the City of Moorhead may regulate any excavation, grading, or filling in a wetland, designated flood plain, or shoreland district. Further consultation with the City, County, and appropriate Watershed Management District should be conducted during the planning phase of any future development within the AUAR area with the potential to impact wetlands.

Currently, no specific development in the AUAR area is planned; however, it is anticipated that the City will avoid impacts (e.g., dredging, filling) to wetlands to the greatest practicable extent during project-specific planning for future development.

MITIGATION STRATEGIES

Both the USACE and WCA require that impacts to wetlands be avoided and minimized to the greatest practicable extent, and that alternatives to impacts are examined. Alternatives can include a 'no build' scenario, as well as examining other potential locations for developments within the AUAR area. The applicant must provide written explanation of the chosen location, and explain why wetland impacts were unavoidable. The proposer will be required to review the development location and determine whether alternative locations are feasible within the AUAR area. Part of the review will include wetland delineation field surveys to map out the extent and spatial arrangement of wetlands and waterways within the AUAR area. The results of the wetland delineation and a Joint Application for Activities Affecting Water Resources in Minnesota (Joint Application) will be submitted to the USACE and local government unit (LGU) administering the WCA for Clay County for preliminary jurisdictional review.

Should alternative locations not be feasible, then the proposer will design the development project in a manner that will minimize and avoid wetland impacts to the greatest practicable extent. The USACE and LGU, and other appropriate stakeholders, will be consulted during this process. Currently, no specific development to the AUAR area is planned; therefore, there are no anticipated impacts to wetlands. However, should wetland impacts become necessary with development within the AUAR area, on-site wetland mitigation will be considered if there are wetland restoration opportunities located within the AUAR area that would yield wetland mitigation credit. Wetland banking will be used if on-site locations are not available and/or if agencies recommend the use of a wetland bank.

- b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.**

Development in the project area is not anticipated to involve the physical or hydrologic alteration of any existing surface waters. However, development could impact the Red River and its tributary streams if stormwater runoff is not managed adequately. The MPCA has already identified portions of the Red River in the Moorhead area as impaired. Additional drainage from urban development could increase sediment and pollutant loads into the Red River. Recognizing this issue, the City of Moorhead has developed a Stormwater Ordinance which addresses

the treatment of stormwater runoff, including construction techniques to minimize erosion and stabilize soils.

The potential for erosion of soils exposed during development of the project area will be minimized using Best Management Practices (BMPs) during and after construction. Specific erosion control practices will be identified in final grading and construction plans for each proposed development project. Developments will be required to meet as necessary the standards of the National Pollutant Discharge Elimination System (NPDES), the City of Moorhead, and the Buffalo-Red River Watershed Management District.

Due to the proximity of the Red and Buffalo rivers to the AUAR area, it is possible that the number of recreational watercraft on these rivers increases with the addition of residential developments. Industrial watercraft usage is not anticipated to increase at this time as no specific industrial development is proposed.

An intensive study on current and projected watercraft usage was not conducted as part of this AUAR. It is anticipated that recreational watercraft usage could increase as residential development increases; however, impacts are expected to be minimal. Future watercraft usage will be studied, as necessary, as specific residential developments are proposed.

12. Solid Wastes, Hazardous Wastes, Storage Tanks

- a. Describe types, amounts, and compositions of solid or hazardous wastes, including solid animal manure, sludge, and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.**

New residential, commercial, and public/institutional uses will generate municipal solid waste (MSW). Sanitation collection, disposal and recycling services will be provided to all properties within the City of Moorhead. Properties in Dilworth or outside of municipal boundaries must contract with private companies for their collection and disposal services.

City of Moorhead Public Works Sanitation Department 2016 data was procured for source data and calculations. The data approximates 31,795 tons of MSW was generated from residential and commercial areas by the City of Moorhead in 2016. From 2006 to 2016 the range of total MSW per year is 27,471 in 2010 to 31,795 tons in 2016, averaging a total of 29,403 tons per year. Proportion of non-recyclable waste stream fate is approximately 50% landfilled and 27% incinerated, and sources are approximately 50% commercial and 50% residential.

Of the total MSW generated per year, a percentage is diverted from the landfill and recycled. In 2016, 20% of the total MSW was recycled, representing approximately 6,492 tons. This percentage is in line with past trends ranging from 19% (2007, 2013, 2014) to 24% in 2010, with an average yearly percentage of 20.7%. Future trends of recycling are

expected to rise approximately 5% as the City of Moorhead implements the “No Sort” Recycling Program.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

AUAR Guidance: No response required.

c. Indicate the number, location, size, and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

A search of MPCA's What's in My Neighborhood database revealed the following aboveground storage tank (AST) and/or underground storage tank (UST) sites in the AUAR area:

- Holiday Station Store #415 – 3478 28th Ave South: Active petroleum UST site TS0125553
- Pactiv Corp SW – 3010 42nd St South: Inactive AST site TS0124172
- Titan Machinery – 3314 70th St South, Glyndon, MN: Inactive UST site TS0005919

The database also revealed the following Leak Sites and/or investigation/cleanup sites present within the AUAR area which may or may not represent active or inactive AST/UST sites:

- Commercial East Acres Truck Plaza – lat. 46.83999 / lon. -96.65023
- Closed (1996) Brownfields Voluntary Investigation and Cleanup VP7220
- Closed (2005) Brownfields Voluntary Investigation and Cleanup VP7221
- Titan Machinery – 3314 70th St S. Glyndon, MN
- Closed (2014) Petroleum Brownfields PB4527
- Closed (2007) petroleum remediation LS0003824

If soil contamination is discovered through due diligence testing or during the course of development, the developer or other responsible party will be required to appropriately mitigate the contaminants according to the type of development planned and in compliance with MPCA rules.

13. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (rare features)

a. Describe fish and wildlife resources as well as habitats and vegetation on or near the site.

A detailed description of the land cover types within the AUAR area is provided in Question 7. Land cover in the project area is primarily agricultural cropland with limited opportunities for wildlife habitat. The vegetative land cover present within the AUAR area provides habitat for urban wildlife species, such as mice, rabbits, raccoons, and squirrels, among others.

Per the NLCD data the AUAR area is primarily cultivated crops and developed lands

(3,610.98 acres [84%] and 659.81 acres [15%], respectively).

Per the NLCD data, approximately 16.91 acres (0.30%) of the future development portion of the AUAR area are upland forest. Although limited, woodland, within the AUAR area may constitute suitable avian migration stopover habitat. Therefore, there is potential for migratory birds to be present within the AUAR area during the spring, summer, and fall. In addition, a few species may winter in the AUAR area; common wintering species in Minnesota include the northern cardinal and the common redpoll.

In addition, the open water and wetland features within the AUAR area may provide suitable habitat for some aquatic species, including fish, frogs and toads. It is anticipated that the wetland and open water support a limited diversity of aquatic species due to the isolation of these features. The woodlands, wetlands and open water located within and near the AUAR area may contain suitable summer habitat and drinking sources for bat species.

- b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-879) and/or correspondence number (ERDB) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.**

Federally Listed Threatened and Endangered Species

Per a review of the U.S. Fish and Wildlife Service's (USFWS's) Endangered Species website², there are two federally listed species with geographic ranges that include Clay County:

- Northern long-eared bat (*Myotis septentrionalis*) – Threatened
- Dakota skipper (*Hesperia dacotae*) – Threatened

The northern long-eared bat (NLEB) is a commonly encountered species throughout the majority of the Midwest, being commonly captured in mist-net surveys (USFWS 2016a³). However, they are typically found in low numbers in hibernacula in the Midwest (USFWS 2016a).

In the winter, NLEB hibernate in large caves and mines that have large passages and entrances, constant temperatures, and high humidity with no air currents. No caves or

² USFWS. 2015. County Distribution of Federally Listed Threatened, Endangered, Proposed, and Candidate Species. <http://www.fws.gov/midwest/endangered/lists/minnesot-cty.html>. Revised April 2015.

³ USFWS. 2016a. Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions. USFWS Regions 2, 3, 4, 5, & 6. January 5, 2016.

structures are present within the AUAR area that would provide suitable winter habitat for this species.

In the spring, summer and fall, NLEB use a wide variety of forested habitats for roosting, foraging and traveling, and may also utilize some adjacent and interspersed non-forested habitat such as emergent wetlands and edges of fields. This species has also been found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable). The bats emerge at dusk to forage in upland and lowland woodlots and tree-lined corridors, feeding on insects, which they catch while in flight using echolocation. This species also feeds by gleaning insects from vegetation and water surfaces (USFWS 2016a).

Roosting habitat includes forested areas with live trees and/or snags with a diameter at breast height (dbh) of at least three inches with exfoliating bark, cracks, crevices and/or other cavities. Trees are considered suitable roost trees if they meet those requirements and are located within 1,000 feet of another suitable roost tree, woodlot, or wooded fencerow (USFWS 2016a). Maternity habitat is defined as suitable summer habitat that is used by juveniles and reproductive females. After hibernation ends in late March or early April, most NLEB migrate to summer roosts. The NLEB active season is the period between emergence and hibernation from April 1 – October 31 (USFWS 2016a).

The AUAR area contains approximately 16.91 acres of deciduous forest. The forest/trees present throughout the AUAR area are unlikely to provide suitable summer habitat for the NLEB due to their size and lack of connectivity to large, contiguous tracts of forest. The wetlands and open water located within and near the site may provide drinking sources for NLEB utilizing habitat outside the AURA area.

Direct mortality from collision with construction equipment is unlikely given that construction activities will occur during daylight hours when bats would not be active. Tree clearing as a result of the proposed development scenarios may affect potentially suitable NLEB summer habitat within the AUAR area. Per a review of the USFWS's White-Nose Syndrome (WNS) Zone map dated June 30, 2017⁴, Clay County, Minnesota is located within 150 miles of a location where WNS has been detected. Therefore, the AUAR area falls within the WNS buffer zone per the Final 4(d) Rule under the Endangered Species Act (ESA).

For areas within the WNS buffer zone, the incidental take (e.g., the harm, harassment or killing of a bat as a side effect of otherwise lawful actions, like tree clearing) from tree removal activities is not prohibited unless 1) it results in removing a known occupied maternity roost tree, 2) if tree removal activities occur within 150 feet of a known occupied maternity roost tree from June 1 through July 31, or 3) tree removal activities occur within 0.25 mile of a hibernaculum at any time. Tree removal activities may then proceed without a permit and there is no need to contact the USFWS.

⁴ USFWS. 2017b. White-Nose Syndrome Zone Around WNS/Pd Positive Counties/Districts. <http://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>. June 30, 2017.

Due diligence is generally required to determine if a maternity roost tree or a hibernaculum is on the property; however, per the Final 4(d) Rule, private landowners are not required to conduct surveys on their lands. In Minnesota, the MDNR maintains records of maternity roost trees or a hibernaculum within its Natural Heritage Inventory System (NHIS) database.

No field surveys for potential roost trees were conducted as part of this assessment; therefore, it is unknown whether suitable roost trees occur in or near the AUAR area. Upon review of the MDNR NHIS database under license agreement LA-879 there are no records of NLEB maternity roost trees or a hibernaculum within the AUAR area or its vicinity.

As there are no records of NLEB maternity roost trees or a hibernaculum within the AUAR area or a 0.25-mile buffer, incidental take of NLEB as a result of tree removal activities is not prohibited under the Final 4(d) Rule under the ESA.

The Dakota skipper is a small butterfly that lives in high-quality mixed and tallgrass prairie. This habitat type is unlikely to be reestablished on a site that has been plowed (e.g., used for agricultural purposes, cropland). According to the USFWS, this species is almost always absent from overgrazed and otherwise degraded prairies. The AUAR area is primarily cultivated crops and developed land; therefore, suitable Dakota skipper habitat is not present within the AUAR area. Subsequently, it is expected that the Project will have no effect on the Dakota skipper. Species-specific surveys are not anticipated to be required for Project development.

Migratory Birds

Construction activities and development within the AUAR area have the potential to impact birds protected under the Migratory Bird Treaty Act (MBTA). The MBTA makes it illegal for anyone to take (i.e., to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.

Under the MBTA, construction activities in grassland, roadsides, wetland, riparian (stream), shrubland, or woodland habitats that would otherwise result in the taking of migratory birds, eggs, young and/or active nests should be avoided. Although the provisions of the MBTA are applicable throughout the entire year, most migratory bird nesting activity in Minnesota occurs approximately from mid-March to August 15, per the MDNR⁵.

According to the USFWS Information for Planning and Conservation (IPaC) Database⁶, there are 22 migratory birds of concern with the potential to occur within the AUAR area.

⁵ MNDNR. 2014. Best Practices for Meeting DNR GP 2004-0001 (version 4, October 2014). http://files.dnr.state.mn.us/waters/watermgmt_section/pwpermits/gp_2004_0001_chapter1.pdf.

⁶ USFWS. 2017c. Information for Planning and Conservation Database. <https://ecos.fws.gov/ipac/>. Website accessed July 24, 2017.

State-Listed Threatened and Endangered Species

Based upon a review of the MDNR NHIS under License Agreement No. 879, there are no known records of state-listed species within the AUAR area. However, the review indicated known records of one species within the vicinity of the East Growth Area:

- Garita skipperling (*Oarisma garita*) – there is one record of this species, observed in 1968, to the northwest of the AUAR area. The record of the species is disputed, and listed as likely to be an accidental occurrence, as the species has been searched for many times in the area since 1968 and was never found. This species is tracked and listed as threatened in the state of Minnesota; however, due to the fact that the record is disputed, and the species hasn't been observed in the area in over 49 years, it is unlikely that development in the East Growth Area will have any effect on the Garita skipperling.

Surveys for the Garita skipperling are not anticipated to be necessary.

Per an analysis of Minnesota Biological Survey (MBS) data, there are no mapped MDNR-mapped Sites of Biodiversity Significance within the AUAR area or the immediate vicinity. There is one mapped high quality plant community, a wet prairie, which was documented in 1994 and is described as occurring between a railroad and highway right-of-way with encroaching tree growth. The wet prairie is located outside of the AUAR area, adjacent to the southwestern boundary.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Development of the East Growth Area is not anticipated to have a significant adverse effect on federally or state-listed threatened and endangered species.

Although a limited area (16.91 acres) of the AUAR area may provide suitable summer habitat for the NLEB, under the Final 4(d) Rule of the ESA, tree clearing is not prohibited as there are no records of NLEB maternity roost trees or a hibernaculum within the AUAR area or a 0.25-mile buffer.

Urban wildlife may be impacted with the removal of woodland and dry grassland within the AUAR area; however, these habitat generalist species are typically adaptive to development activities and would likely relocate to undeveloped areas in the vicinity or continue to live in the remaining undeveloped areas within the AUAR area.

Construction activities in grassland, roadsides, shrubland, or woodland habitats within the AUAR area may result in the taking of migratory birds, eggs, young and/or active nests, if present. Although the provisions of the MBTA are applicable throughout the entire year, most migratory bird nesting activity in Minnesota occurs approximately from mid-March to August 15. When possible, removal of vegetation will occur outside of this timing window to minimize potential take of migratory birds, if present.

Construction activities that involve soil disturbance can result in the introduction and spread of invasive species. Minnesota statutes (Chapter 18) and local ordinances regulate management of noxious weeds and invasive species. Best management practices during construction activities and operation within the Phase 1 parcel of the AUAR area will be implemented to minimize the introduction or spread of noxious weeds and invasive species at the site.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

The Proposer will limit impacts to wooded and wetland areas to the greatest practicable extent during development. Per the GAP, approximately 4.36 acres of wildlife habitat (deciduous forest) within the AUAR area will be developed. The AUAR area is zoned for full development; however, wildlife habitat will be avoided where possible. The developer should consult with the MDNR prior to development and construction, as necessary; however, the potential presence of these species is not anticipated to prevent development. Species-specific surveys will be conducted, if recommended or required by the MDNR, to prevent impacts to state-listed species to the greatest practicable extent.

MITIGATION STRATEGIES

Although there are no records of NLEB maternity roost trees or a hibernaculum within the AUAR area or a 0.25-mile buffer, when possible, tree clearing will occur outside of the NLEB pup season, June 1 through July 31. Although a field survey by a qualified biologist could determine the absence/presence of a maternity roost tree within the AUAR area; under the Final 4(d) Rule of the ESA, field surveys are not required to complete due diligence at the site. Prior to tree clearing within the AUAR area, the MDNR/USFWS-issued list of NLEB records for Minnesota⁷ must be consulted to ensure activities will not 1) result in removing a known occupied maternity roost tree, 2) occur within 150 feet of a known occupied maternity roost tree from June 1 through July 31, or 3) occur within 0.25 mile of a hibernaculum at any time. The MDNR anticipates updating this list twice annually on April 1 and October 1.

If tree clearing cannot be avoided during the peak breeding season for migratory birds (approximately mid-March to August 15), it is recommended that a qualified biologist will conduct a pre-construction breeding bird survey within AUAR area to determine the absence or presence of breeding birds and their nests. Pre-construction breeding bird surveys may include:

- 1) Pre-construction surveys that occur no more than two weeks before tree and shrub clearing activities commence. The area surveyed will include the areas where potential suitable habitat has been identified and tree or shrub clearing has not been completed.

⁷ MNDNR and USFWS. 2015. Townships Containing Northern Long-eared Bat Roost Trees and/or Hibernacula. http://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map_20150604.pdf. April 1, 2017

- 2) If an occupied nest is observed during the survey, tree and shrub clearing activities will not be permitted within a 0.12-mile buffer of the nest site during the breeding season or until the fledglings have left the area. Consult with the USFWS to avoid take of the species.

Upon completion, the survey results will be submitted to the USFWS, as appropriate. If breeding birds are not present, construction can proceed with no restrictions. If breeding birds or active nests are present, additional consultation will be required.

The results of the MDNR NHIS review are typically valid for one year. The NHIS database should be consulted prior to the commencement of construction activities within the AUAR area to identify any new records of rare or otherwise significant species, native plant communities, and other natural features within the AUAR area vicinity.

Best management practices and erosion and sediment control devices will be used during construction activities to prevent the flow of sediment into wetlands and open water within or adjacent to the AUAR area, which could result in adverse effects to water quality (e.g., turbidity) and aquatic species, if present. Wildlife-friendly erosion control materials will be used, whenever feasible (due to natural wetlands and proposed greenspace).

14. Historic Properties

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

No archaeological sites and four architectural resources are located within the AUAR area. An additional 21 architectural resources are located within a mile of the AUAR area. The architectural resources within the AUAR area include the Mueller farmstead (CY-GYT-005), an unnamed farmstead (CY-MHC-101) an unnamed Clay County ditch (CY-MHC-0096), and State highway 10 (CY-MCH-100). Of the four resources within the AUAR area, none of the resources have been listed or determined eligible. The architectural resources within the vicinity represent bridges, ditches, houses, farmsteads, commercial buildings, the state highway and the railroad. One of these resources a barn (CY-DWC-004) is considered eligible and the remaining resources have not been evaluated.

If proposed development should be conducted within 150 feet of a previously recorded architectural resource a Phase II evaluation should be conducted to provide recommendations for eligibility of the resource if it cannot be avoided. If any of the buildings are determined eligible as a result of Phase II evaluation, direct and indirect effects should be taken into account and coordination with the SHPO should occur.

15. Visual

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The AUAR anticipates a development pattern similar to those uses in the surrounding area and does not anticipate any adverse visual impacts as a result of the development scenario.

16. Air

- a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.**

Stationary source emissions will not be produced by the project.

- b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.**

Section 109(b) of the Clean Air Act (CAA) requires that the EPA establish National Ambient Air Quality Standards (NAAQS) "requisite to protect" public health and public welfare (40 CFR Part 50). The CAA identifies two class types of NAAQS: primary standards and secondary standards. Primary standards are limits set to protect the public health of the most sensitive populations, such as asthmatics, children and the elderly. Secondary standards are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife and structures. The CAA requires the EPA to periodically review and, if new data indicate, update the NAAQS.

The EPA has promulgated NAAQS for six criteria pollutants: ozone, particulate matter (PM), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO) and lead. Standards for PM are categorized on the size of the PM based on the aerodynamic diameter of the PM. PM₁₀ represents particulate matter with an aerodynamic diameter of less than 10 microns and PM_{2.5} is PM with a diameter of less than 2.5 microns.

In Minnesota, the Minnesota Pollution Control Agency (MPCA) monitors and regulates air pollution. MPCA is required to develop regulations, referred to as the State Implementation Plan (SIP) to outline how the areas under their jurisdiction will attain and maintain ambient air concentration levels in compliance with the NAAQS. Within their SIP, MPCA has developed state air quality regulations under Section 7009.0800 of the Minnesota Administrative Rules. In general, the state standards mirror the USEPA NAAQS. The primary difference is the state has developed ambient air quality standards for hydrogen sulfide (H₂S).

Minnesota had several areas designated as nonattainment for lead, PM10, and SO₂ during the 1980s and 1990s. These areas were primarily located in the seven-county Twin Cities Metropolitan Area. These areas were all redesignated to attainment by 2002 and are now considered maintenance areas, which require the state to regularly assess monitoring information, changes to emission patterns, and perform evaluation of the SIP requirements to assure that the areas continue to maintain their attainment status. The remainder of the state including the Moorhead area has been designated as attainment for all pollutants.

Carbon monoxide (CO) levels are elevated near roadway intersections due to the emission of this pollutant from the vehicles idling and passing by. The State of Minnesota has ambient CO standards that are designed to protect human health and the environment. The state standards are:

- 1-hour average: 30 parts per million (ppm); and
- 8-hour average: 9 ppm.

Concentrations near or above these levels are most likely to occur near intersections that are congested and have high traffic volumes. The Minnesota Department of Transportation has developed a screening method designed to identify intersections that may cause a CO impact above the State standards. This method requires an intersection to be heavily congested (Level of Service F) and have a traffic volume of greater than 140,000 vehicles per day in order to be considered to have the potential for causing CO air pollution problems. None of the intersections in the AUAR area exceed the criteria under any of the scenarios that would lead to a violation of the air quality standards. For the scenario with the highest intensity of development (Scenario 3), the highest volume intersections have volumes around 6,000 – 7,000 vehicles in the peak hour. With a K-factor⁸ of 0.10, this translates into a daily volume of approximately 70,000 vehicles per day, which is lower than the threshold of 140,000 vehicles (see Section 9 of the Traffic Impact Study in Appendix D)

Sulfur dioxide emissions are primarily associated with power plants and specific industrial activities. Automotive traffic is not a major source of sulfur dioxide emissions. Diesel engines were formerly a source of sulfur dioxide emissions, but recent federal air pollution regulations mandated that all on-road diesel fuel be converted to ultra-low sulfur diesel, which contains less than 15 parts per million sulfur. Therefore, truck traffic is no longer a significant source of sulfur dioxide emissions.

Like carbon monoxide, nitrogen dioxide emissions are elevated near roadway intersections due to the emission of this pollutant from the vehicles idling and passing by. MPCA has performed long time ambient air monitoring for this pollutant throughout the Twin Cities area at heavily trafficked intersections. No exceedances of the NAAQS for nitrogen dioxide have been monitored. Therefore, none of the intersections in the AUAR

⁸ K-factor is defined as the proportion of annual average daily traffic occurring in an hour.

area under any of the traffic scenarios would result in a violation of the air quality standard for nitrogen dioxide.

Nitrogen dioxide and volatile organic compound emissions from vehicular traffic contribute to the formation of ozone. Ground-level ozone, also known as smog, is produced on hot, sunny days by a chemical reaction between VOCs and oxides of nitrogen (NOx). VOCs are released from activities such as the use of paints and solvents. NOx emissions are released from motor vehicles, power plants, and other activities that require fuel combustion. Levels of ozone are dependent on the amount of VOCs and NOx in the air as well as weather conditions including sunlight, temperature, and wind speed and direction. In Minnesota, the highest levels of ozone occur on hot and sunny summer days. Due to the conditions necessary to create ozone, ozone is considered a regional pollutant and is not associated with small, localized changes in traffic conditions. Since the development being analyzed within this AUAR will not result in any significant changes to the vehicular emissions within the Moorhead metropolitan area and the Moorhead area currently attains the ozone NAAQS, the nitrogen dioxide and volatile organic compound traffic emissions associated with this project would not result in a violation of the air quality standard for ozone.

Vehicular traffic is not a significant contributor to particulate or lead emissions. Lead was removed as an additive from gasoline in the 1970s. Federal regulations have been implemented over the past two decades that have substantially reduced particulate emissions from diesel truck engines. Continued turnover of current truck fleets in the coming years will result in reductions of diesel particulate impacts from vehicular traffic throughout the nation and within the AUAR study area. Since the AUAR study area currently attains the lead and particulate matter NAAQS, this project will not result in a violation of the air quality standards.

- c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.**

Per EQB Guidance, dust and odors need not be addressed in an AUAR (as no industrial uses are proposed) unless there is some unusual reason to do so. There is no unusual reason to do so with respect to the proposed project.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Minnesota Rules Chapter 7030 provides the Minnesota standards for noise. These standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of health and welfare. These standards are designed to be consistent with sleep, speech, annoyance, and hearing conservation requirements for receivers within areas grouped according to land use activities. The Minnesota standards are as follows:

Table 17-1: Minnesota Pollution Control Agency State Noise Standards

Land Use	Code	Day (7:00 a.m. - 10:00 p.m.) dBA		Night (10:00 p.m. - 7:00 a.m.) dBA	
Residential	NAC-1	L10 of 65	L50 of 60	L10 of 55	L50 of 50
Commercial	NAC-2	L10 of 70	L50 of 65	L10 of 70	L50 of 65
Industrial	NAC-3	L10 of 80	L50 of 75	L10 of 80	L50 of 75

Notes:

- NAC-1 includes household units, transient lodging and hotels, educational, religious, cultural entertainment, camping and picnicking land uses.
- NAC-2 includes retail and restaurants, transportation terminals, professional offices, parks, recreational and amusement land uses.
- NAC-3 includes industrial, manufacturing, transportation facilities (except terminals), and utilities land uses.
- From Minnesota Pollution Control Agency, Minn. Rules sec. 7030.0040

L10 means the sound level which is exceeded for 10 percent of the time for a one-hour period. L50 means the sound level that is exceeded 50 percent of the time for a one-hour period. Sound levels are expressed in dBA. A dBA is a unit of sound level expressed in decibels and weighted for the purpose of approximating the human response to sound.

Minnesota Statutes, Section 116.07, Subd. 2a, exempt noise from local and county roads from the requirements of these noise rules unless full control of access to the road has been acquired. This statute exempts noise from all roadways in the AUAR area.

18. Transportation

- a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.**

The basis of this East AUAR is to assess impacts to Moorhead's transportation system because of revised growth assumptions, future land uses and proposed transportation improvements associated with the approved 2016 Moorhead Growth Area Plan (GAP). This AUAR considers the updated 2014 LRTP which was developed, reviewed, and approved by the Fargo-Moorhead Metropolitan Council of Governments (Metro COG), Minnesota Department of Transportation (MnDOT), Federal Highway Administration (FHWA), Clay County, and the City of Moorhead. The 2014 LRTP guides how the region grows and invests transportation dollars out to the year 2040 and can be accessed using the following link <http://fmmetrocog.org/new/index.php?id=127>.

For the purposes of Comprehensive Planning, the 2016 GAP proposed future land use and transportation improvements with an anticipated full buildout of 50 years or more. However, for the purposes of transportation planning, this AUAR identified transportation system needs

out to the year 2040 which is just a portion of growth at full buildout and coincides with the approved 2014 LRTP. Since specific developments in the east growth area are not yet proposed, traffic-related specifics such as number of existing/proposed parking spaces could not be considered. As future development occurs in the east growth area, subsequent AUAR's would re-assess traffic related impacts to the transportation system through detailed traffic impact analyses.

The growth assumptions outlined in the 2014 LRTP for population, households, and persons per household are shown in Table 18.1. Moorhead is projected to continue steady growth in population and households out to 2040.

Table 18-1: 2014 LRTP Household/Population Projections

Growth Category	2010	2040	% Change 2010-2040
Population	38065	54990	44.5%
Households	14304	21350	49.26%
Persons Per Household	2.66	2.58	-3.01%

Existing Metro COG travel demand model (TDM) results from the 2014 LRTP were used to reflect traffic conditions in the East growth area. 2040 model runs from the 2014 LRTP were utilized to document capacity issues, identify mitigation methods, and define network revisions.

Table 18-2: TDM Forecasted AADT

Link	Functional Class	2010 Existing Daily Volumes	2020 Forecasted Daily Volumes on E + C Network ^a	2040 Forecasted Daily Volumes on Fiscally Constrained Network ^b
12 th Ave S (west of 50 th St S)	Minor Arterial	1800	2400	5500
45 th St S	Collector	400	1000	2800
50 th St S	Collector/local	200	1000	3300
28 th Ave S	Collector	400	1300	2600

^a E+C Network = Existing Plus Committed Network and is defined as the existing roadway network combined with the projects currently programmed or budgeted out to the year 2020.

^b Fiscally Constrained Network is defined as the roadway network feasible within the budgeting constraints of current revenues out to the full 2040 build horizon.

The forecasted Annual Average Daily Traffic (AADT) volumes on links within the East growth area is shown in Table 18.2. The percentage of AADT occurring during the peak hour was estimated using MnDOT Automated Traffic Recorder (ATR) 43, which is in a similar area type along TH 10. Table 18.3 shows that peak hour traffic was determined to be 12.0 percent of AADT occurring on a weekday between 3-5PM. Directional distribution in the peak direction was determined to be 63%.

Table 18-3: Percent of AADT in Peak Hour for East Growth Area

ATR #	% of AADT in Peak Hour by Year					
	2012	2013	2014	2015	2016	Average
043	N/A	N/A	11.9	12.2	12.0	12.0

The Metro COG TDM forecasts the magnitude of additional trips added to the network by applying trip production equations to demographic and socioeconomic data. The resulting trip production rates are balanced with attraction rates obtained from NCHRP 714 and the ITE trip generation manual. Forecasted trips are distributed and assigned to the network to generate future AADT. Forecasted AADT for a 2040 buildout is shown in Table 18.2.

Transit/Public Transportation

Metro Area Transit Bus (MATBUS) is the public transportation system serving the communities of Fargo ND, West Fargo ND, Moorhead MN, and Dilworth MN. They currently provide 24 fixed routes linking riders to employment, education, healthcare, entertainment and more. Currently, the only MATBUS route within in the east growth area is Route 9. Route 9 runs in a north-south direction along 34th Street between 8th Avenue Northwest (runs through Dilworth Walmart) and 27th Avenue South (runs to Sanford Health Hospital). As outlined in the 2014 LRTP, expanded transit coverage in 2040 is expected to serve areas at the western fringe of the east growth area with shorter 15-minute headways. Additional transit routes serving the proposed growth areas are recommended as full buildout occurs and densities increase. Transit coverage for 2020 and 2040 is shown in Figure 18.4.

- b. Discuss the effect on traffic congestion on affected roads, and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceed 2,500, a traffic impact study must be prepared as a part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 or a similar local guidance.**

The impact to the regional transportation system was assessed using the Metro COG's TDM developed as part of the 2014 LRTP. The model was updated in 2013 considering committed improvements out to the year 2040. Forecasted traffic through 2040 did not suggest major impacts to the transportation system.

Fargo-Moorhead Metro COG's TDM assigns capacity based on the functional class, number of lanes, and intersection configuration. Base capacities for each functional class were modified according to the number of lanes. Link volume to capacity ratios for existing roadways within the east growth area are summarized in Table 18.4.

Table 18-4: Link Volume to Capacity Ratios 2040 (2014 LRTP)

Link	Functional Class	V/C 2010 Existing Daily	V/C 2020 Forecasted	V/C 2040 Forecasted

			Daily Volumes on E + C Network ^a	Daily on Fiscally Constrained Network ^b
12 th Ave S (west of 50 th St S)	Minor Arterial	0.16	0.21	0.49
45 th St S	Collector	0.05	0.13	0.37
50 th St S	Collector/local	0.03	0.13	0.44
28 th Ave S	Collector	0.05	0.17	0.35

^a E+C Network = Existing Plus Committed Network and is defined as the existing roadway network combined with the projects currently programmed or budgeted out to the year 2020.

^b Fiscally Constrained Network is defined as the roadway network feasible within the budgeting constraints of current revenues out to the full 2040 build horizon.

Table 18.4 shows that links within the east growth area would operate below capacity using projected traffic through 2040. A demand-to-capacity ratio less than 0.85 suggests that the links are operating below capacity with no excessive delay experienced. Poor operation is indicated by demand-to-capacity ratio between 0.95 and 1.0.

c. Identify measures that will be taken to minimize or mitigate project-related transportation effects.

Proposed roadway improvements needed to accommodate full buildout of the east growth area beyond 2040 are summarized below:

- TI #1 - Construction of 55th Street minor arterial
- TI #2 - Construction of 65th Street South collector
- TI #3 - Construction of 24th Avenue South collector
- TI #4 - Connection of 45th Street South to Main Avenue South and 24th Avenue South
- TI #5 - Re-alignment of 28th Avenue South collector north of I-94
- TI #6 - Elimination of 50th Street South local collector beyond 28th Avenue South
- TI #7 - Construction of 60th Street South local collector
- TI #8 - Construction of 55th Street South future interchange connection with Interstate-94 (I-94)
- TI #9 - Construction of 12th Avenue South future interchange connection with TH 336.
- TI #10 - Construction of 55th Street South BNSF overpass connecting the east growth area to TH 10 and 12th Street NE.

The proposed 55th Street South minor arterial is intended to provide mobility through the growth area from north-south with speed limits in the 35-40 mph range. Its main function is to connect collector roadways, such as 4th Avenue South, to principal arterials or interstate highways. The 4th Avenue South, 65th Street South and 28th Avenue South collector roadways would provide access to adjacent land uses while connecting local collector roadways to minor arterials. The proposed transportation system for the east growth area was developed as part of the 2016 GAP and is shown in Figure 18.2.

19. Cumulative Potential Effects

Cumulative potential effects are addressed throughout the AUAR as the AUAR reviews the potential impacts of development scenarios that will include multiple projects that will develop through the growth year 2040. The response to this question specifically addresses reasonably foreseeable projects that may interact with development in the AUAR area.

- a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.**

Full build-out of the AUAR area is expected to occur through the growth year 2040, depending on market conditions. The geographic scale of potential effects is assumed to be a one-mile radius of the AUAR area. No significant developments have been identified within this area and none were mentioned by any agency representatives who attended the scoping informational meeting. Anticipated cumulative impacts are associated with normal growth and development and they will be addressed in the 2040 Comprehensive Plan Update and the five-year updates of the AUAR.

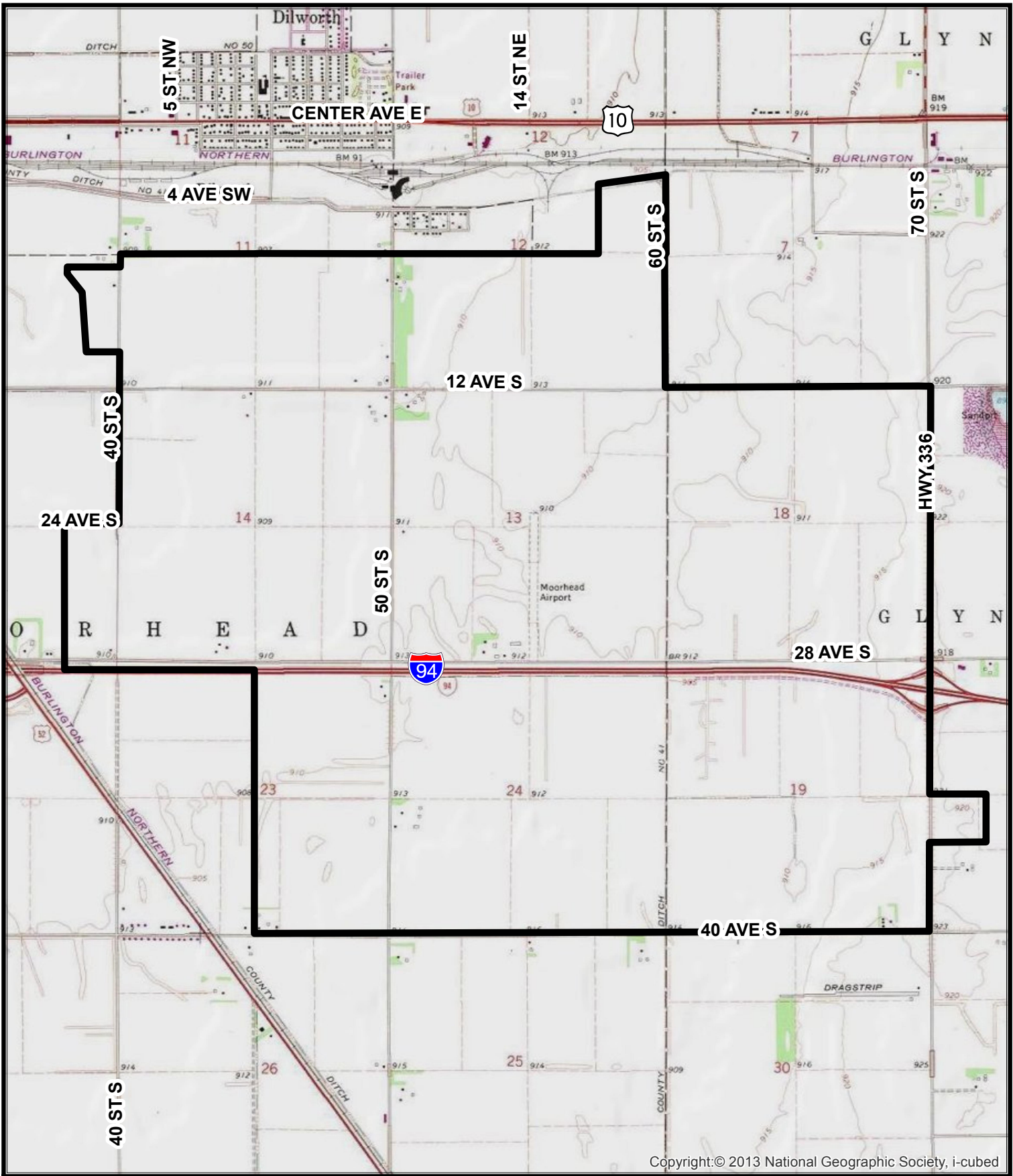
- b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.**

All cumulative impacts associated with anticipated development within the AUAR area have been accounted for within the responses to AUAR questions. In addition, surrounding jurisdictions have been contacted and no significant developments have been identified.

- c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.**

All cumulative impacts associated with known proposed development within the AUAR area have been accounted for within the responses to the EAW questions contained in this AUAR.

Appendix A - Figures



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USGS Map

East Moorhead/Dilworth AUAR

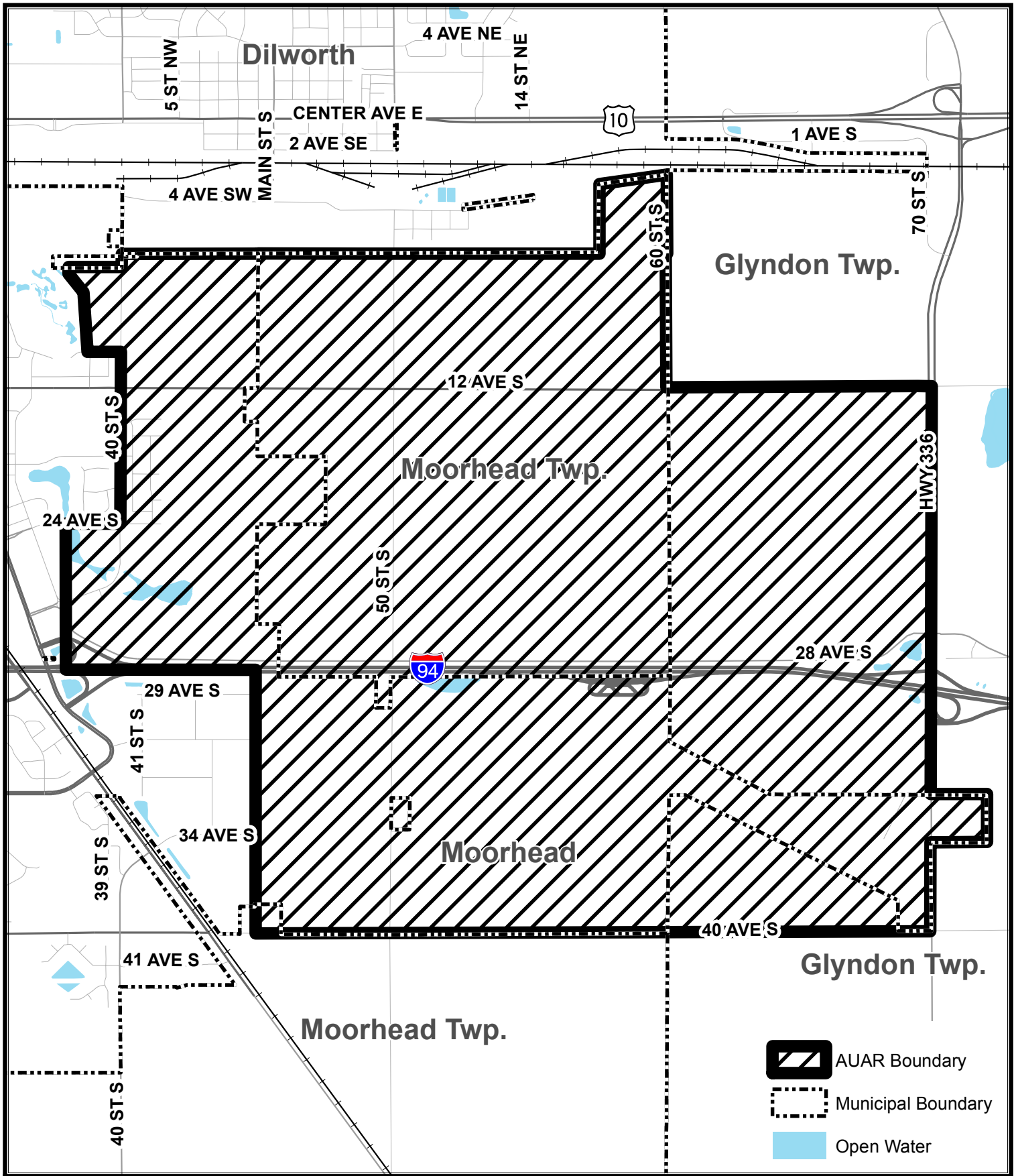
Figure 5-1

June 6, 2017



 AUAR Boundary



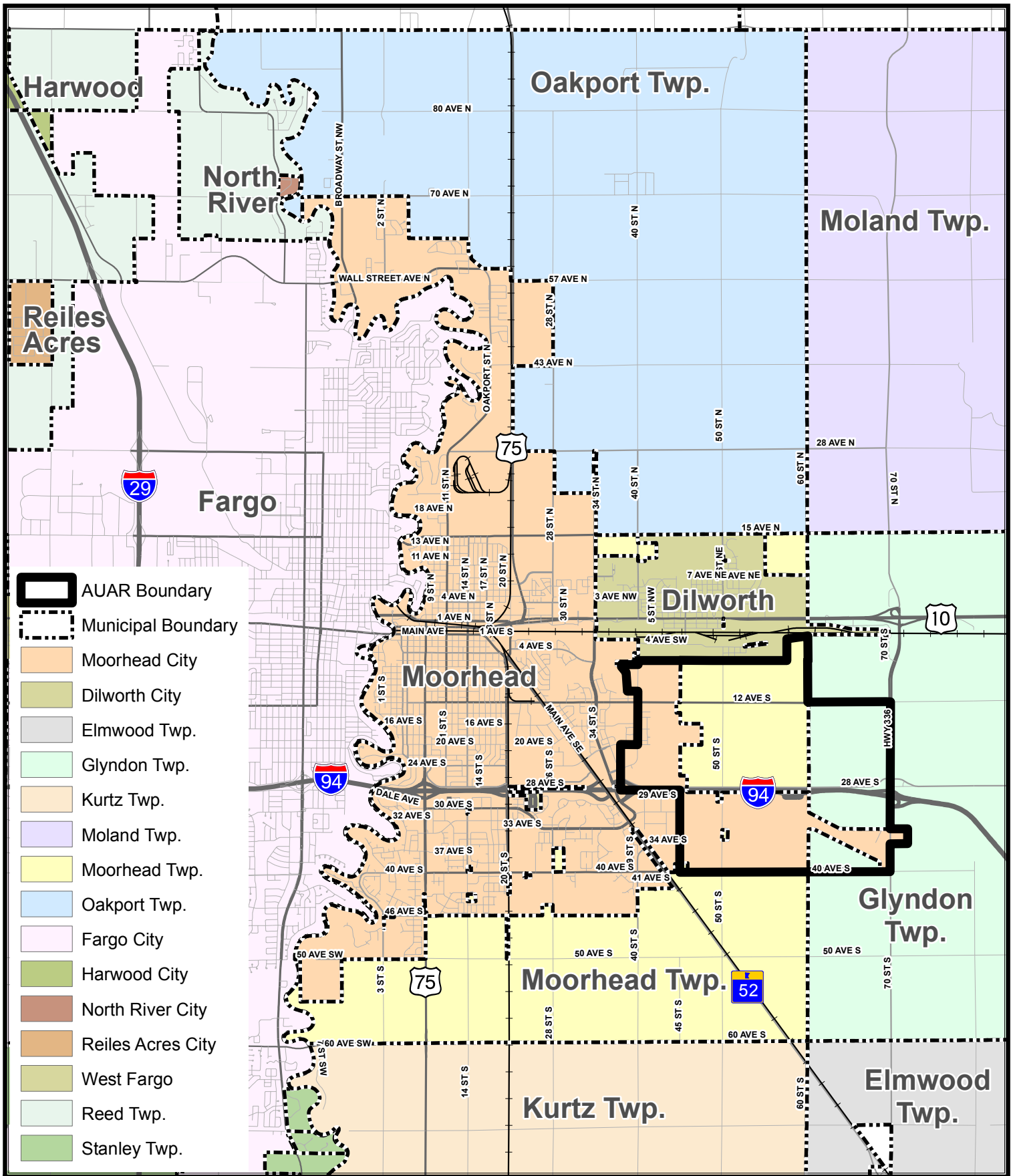


AUAR Boundary
 East Moorhead/Dilworth AUAR

Figure 5-2

June 6, 2017



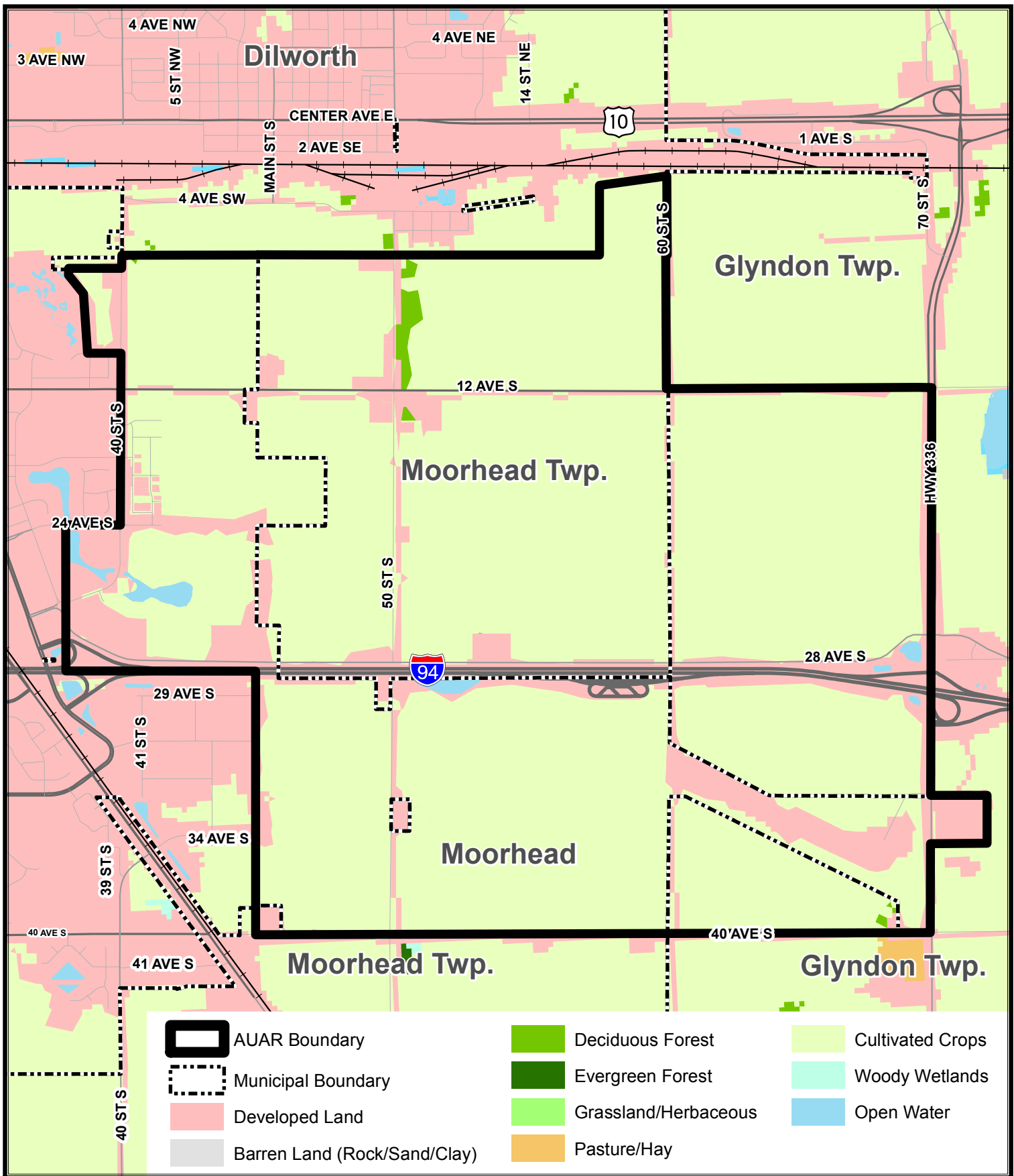


Project Location
East Moorhead/Dilworth AUAR

Figure 5-3

June 6, 2017



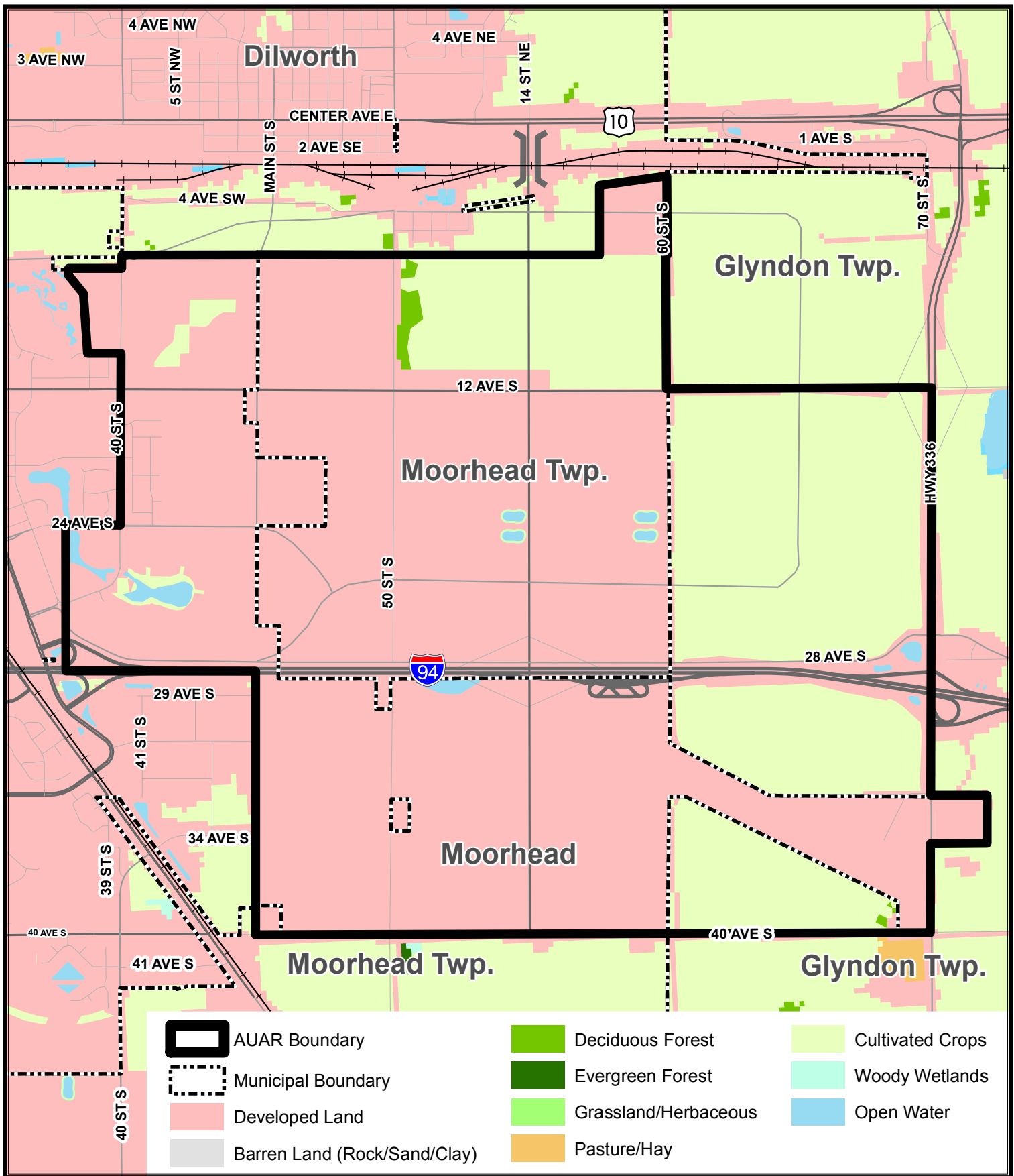


Land Cover Types
East Moorhead/Dilworth AUAR

Figure 7-1

June 21, 2017





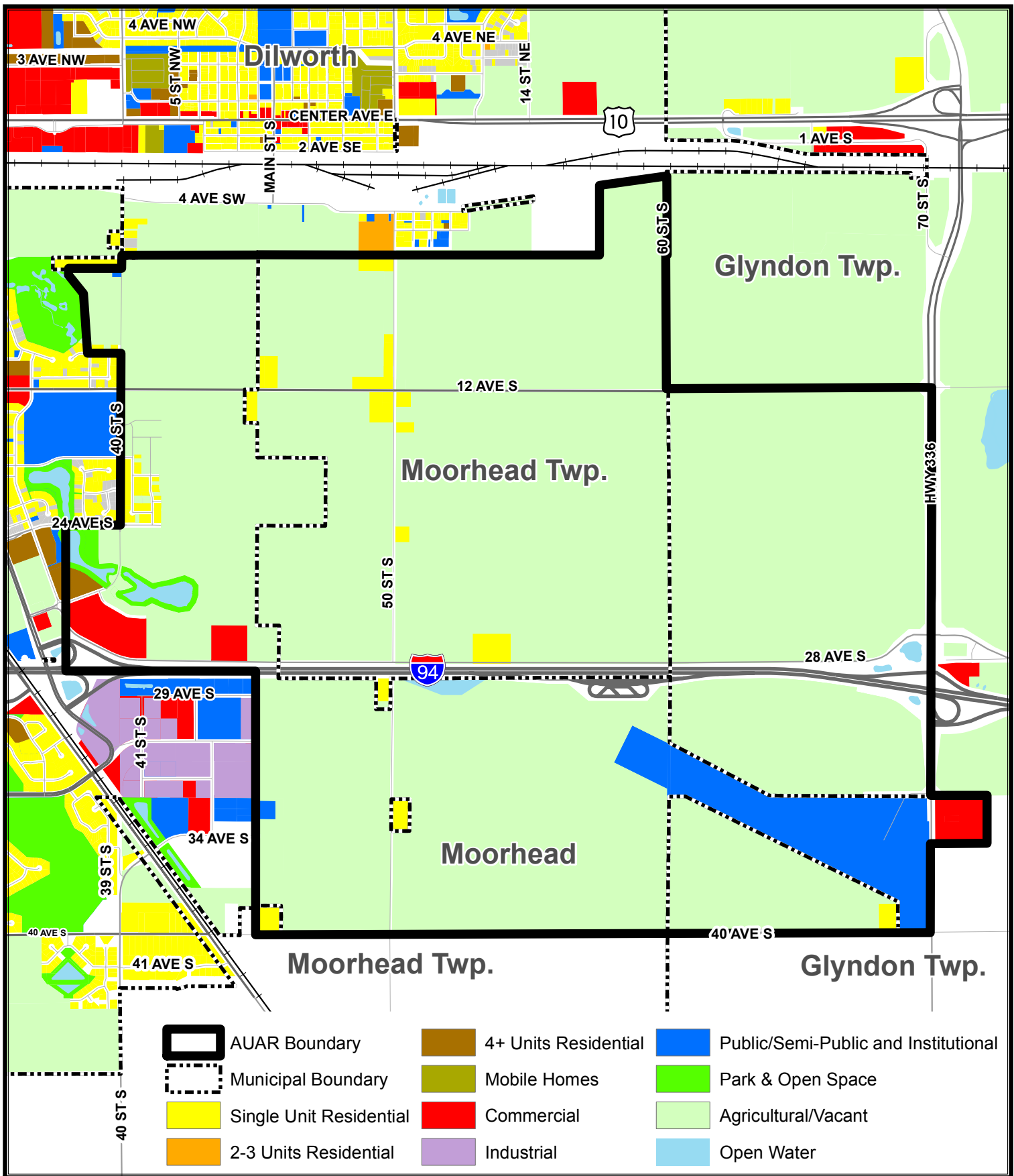
Land Cover Types after Future Land Use Development

East Moorhead/Dilworth AUAR

Figure 7-2

June 22, 2017

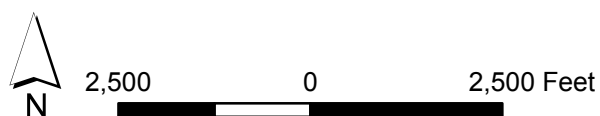


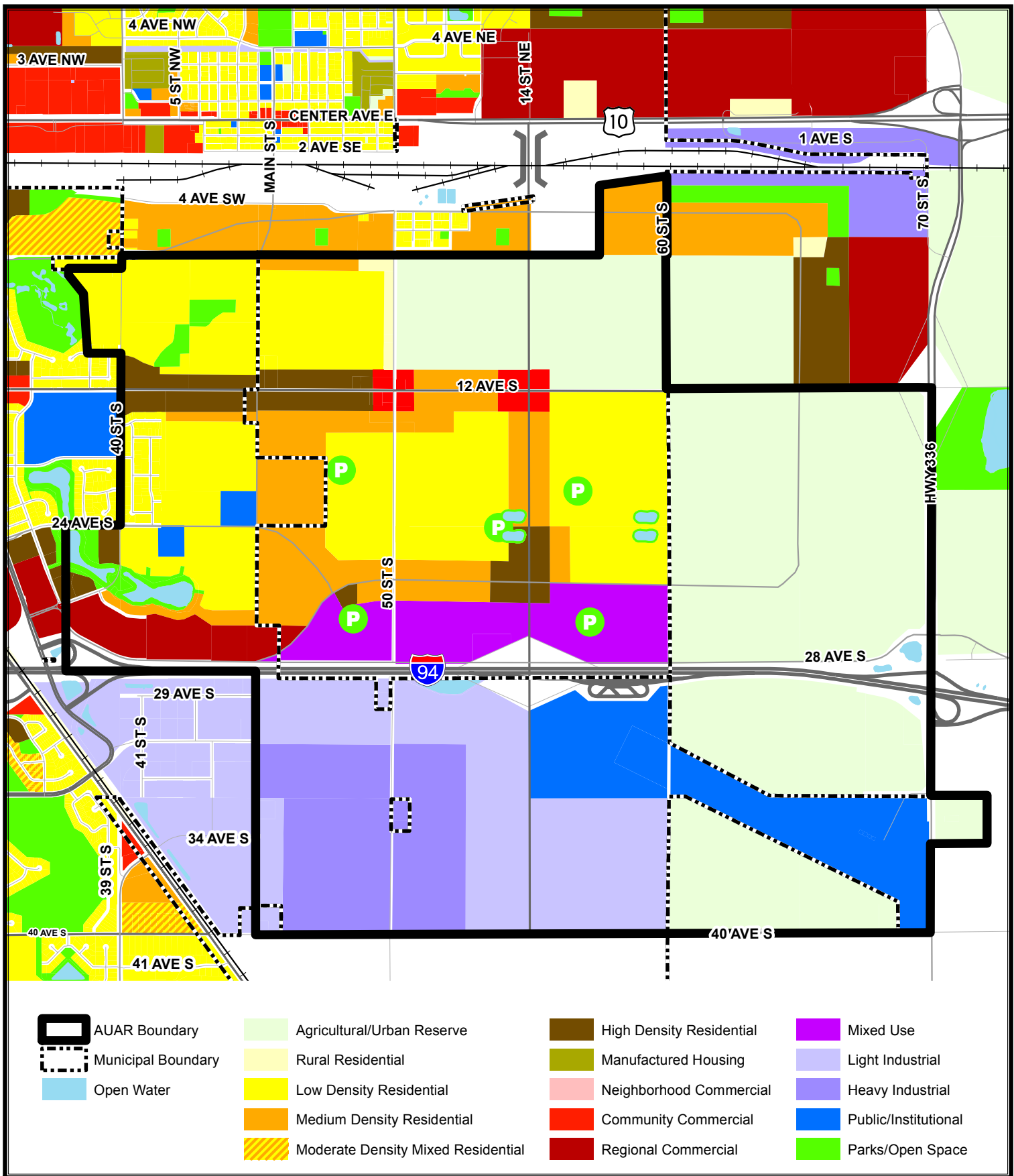


Existing Land Use
East Moorhead/Dilworth AUAR

Figure 9-1

June 1, 2017

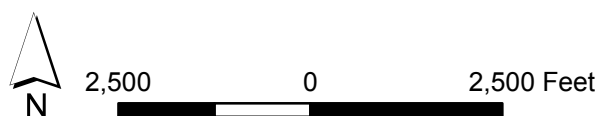


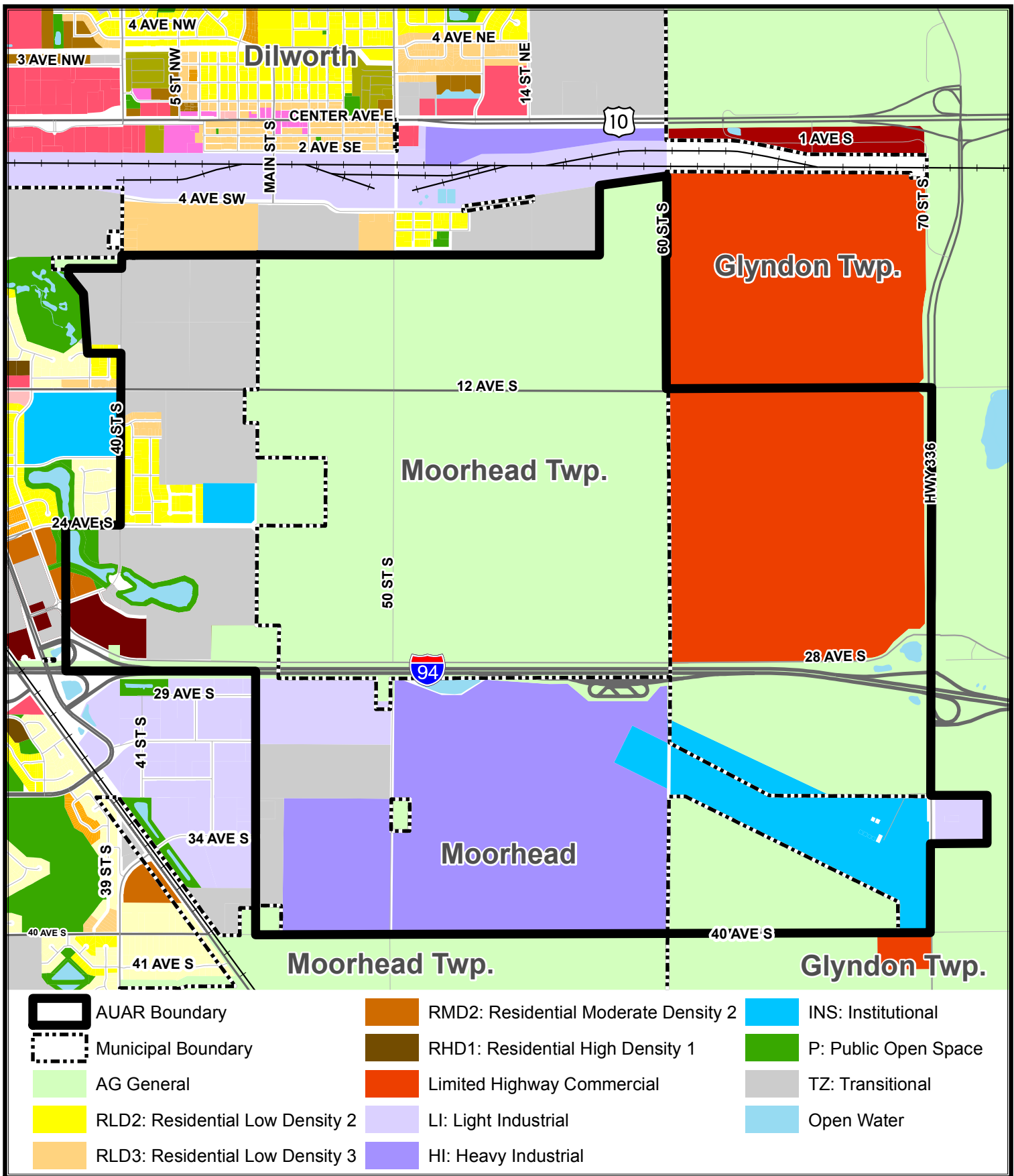


Planned Future Land Use
East Moorhead/Dilworth AUAR

Figure 9-2

June 2, 2017



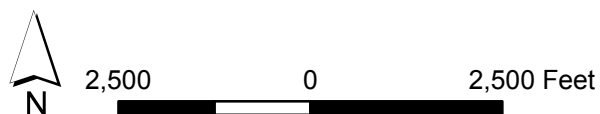


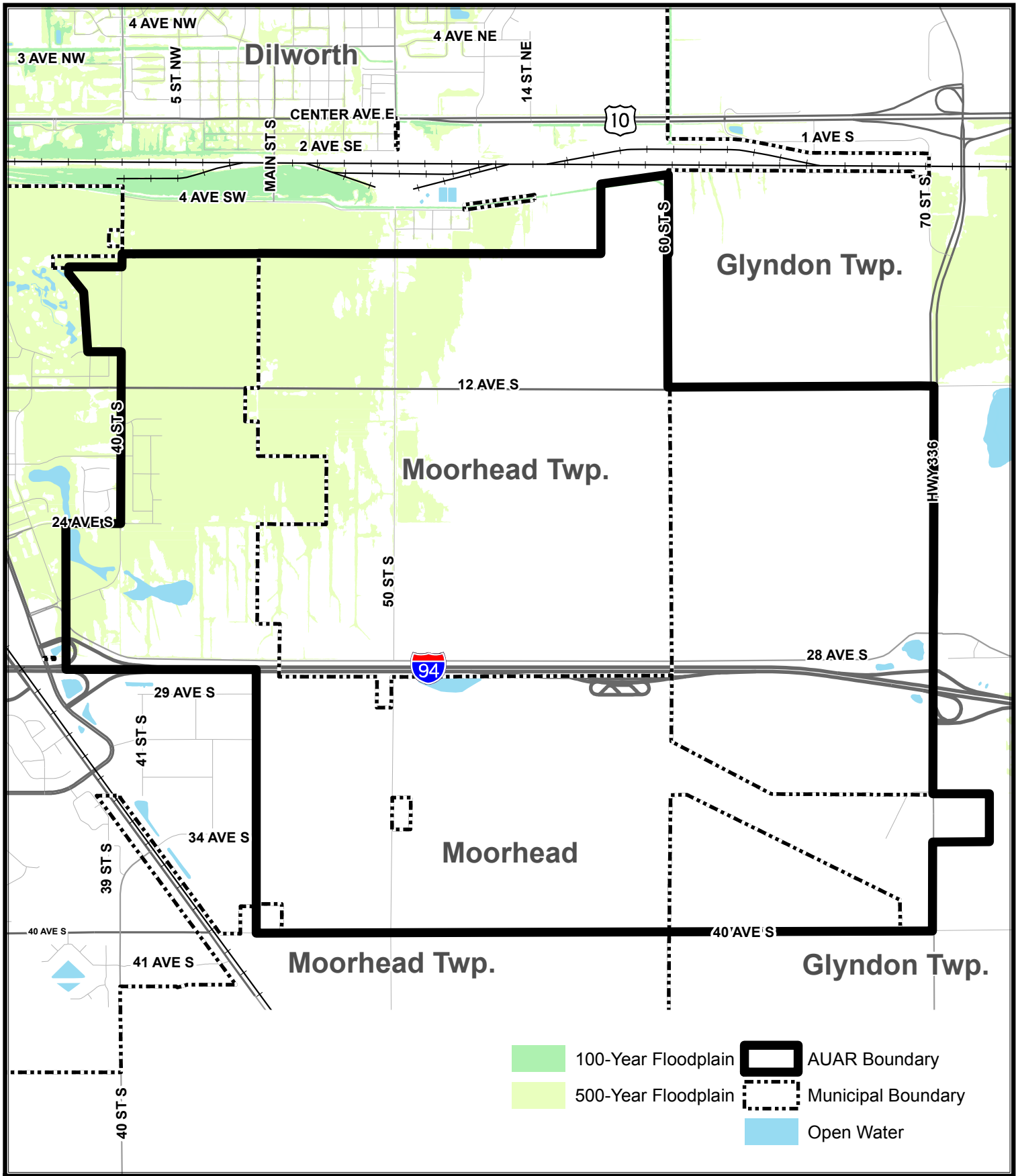
Existing Zoning Designations

East Moorhead/Dilworth AUAR

Figure 9.3

October 19, 2017



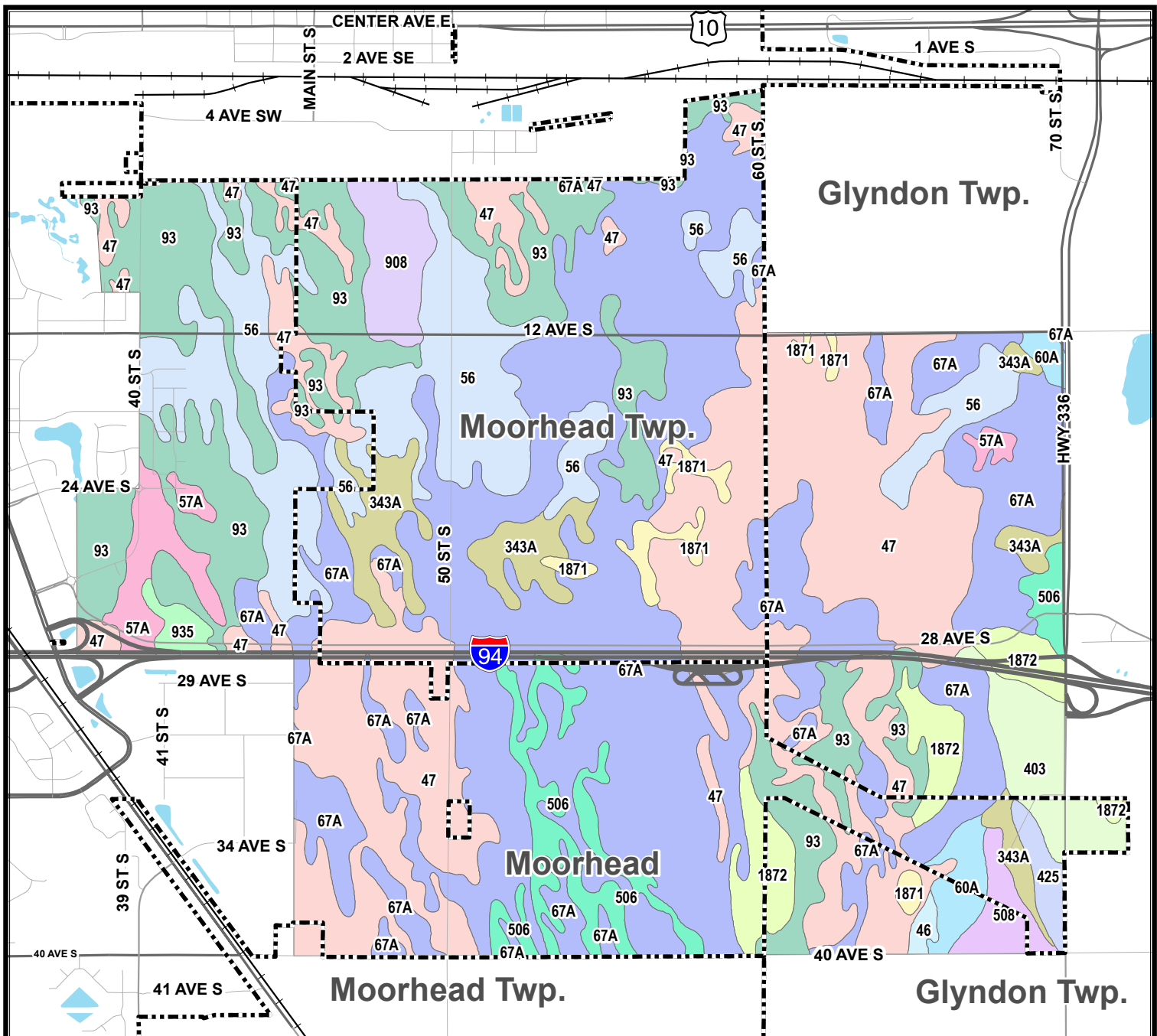


FEMA Floodplains
 East Moorhead/Dilworth AUAR

Figure 9.4

September 18, 2018





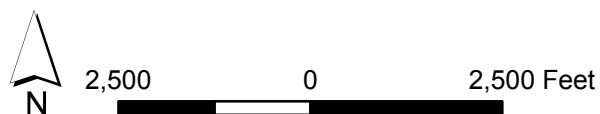
MUSYM	MUNAME	MUSYM	MUNAME
46	Borup Loam	935	Hegne-Fargo Silty Clays
47	Colvin Silty Clay Loam	1871	Fargo Silty Clay, Swales
56	Fargo Silty Clay Loam	1872	Fargo Silty Clay, Silty Substratum
93	Bearden Silty Clay Loam	293B	Swenoda Sandy Loam, 1 To 4 Percent Slopes
403	Viking Sandy Clay Loam	343A	Wheatville Silt Loam, 0 To 2 Percent Slopes
425	Donaldson Fine Sandy Loam	57A	Fargo Silty Clay, 0 To 2 Percent Slopes
506	Overly Silty Clay Loam	60A	Glyndon Loam, 0 To 2 Percent Slopes
508	Wyndmere Fine Sandy Loam	67A	Bearden Silt Loam, 0 To 2 Percent Slopes
908	Bearden-Fargo Complex		

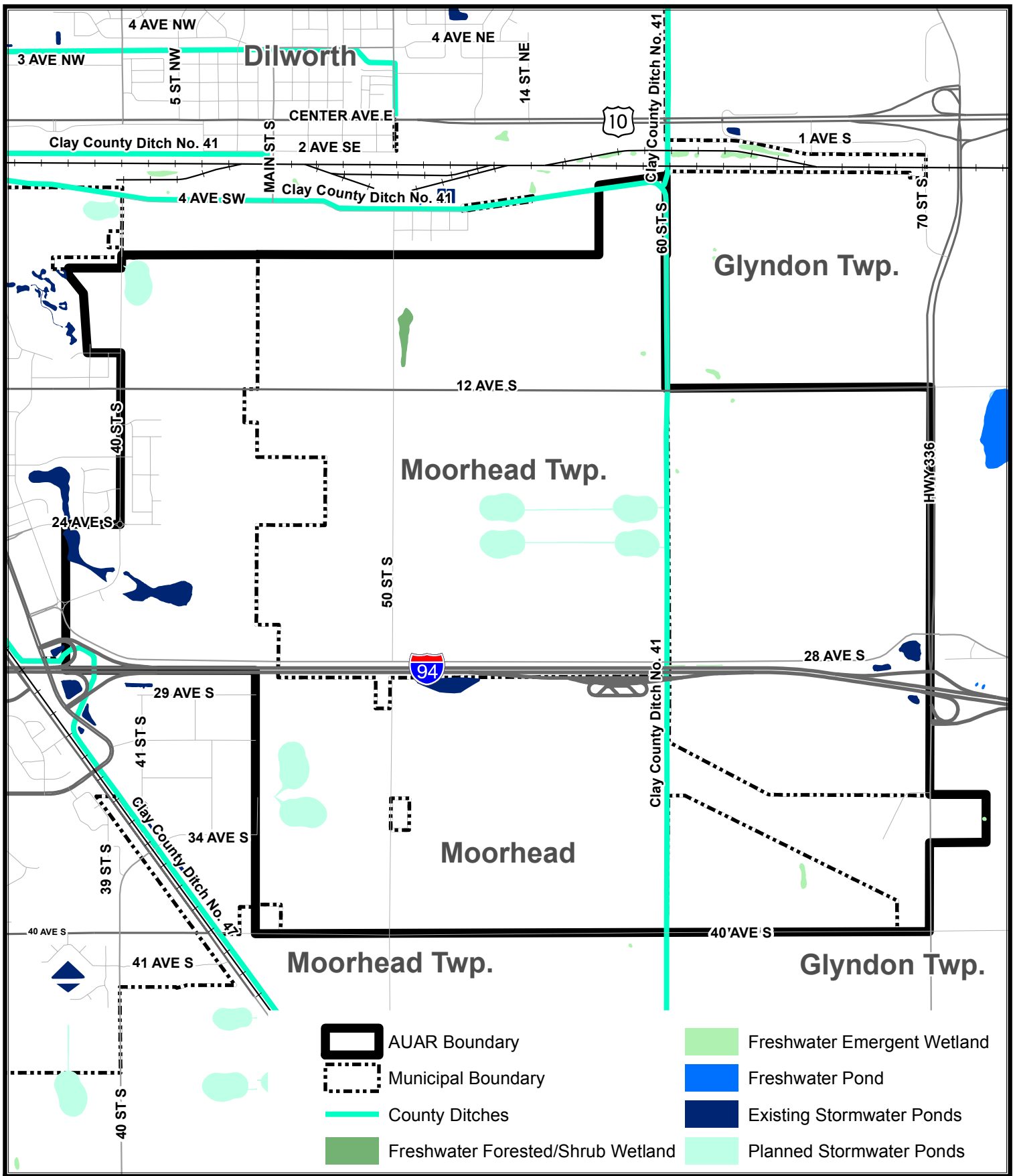
Soils

East Moorhead/Dilworth AUAR

Figure 10.1

January 30, 2018

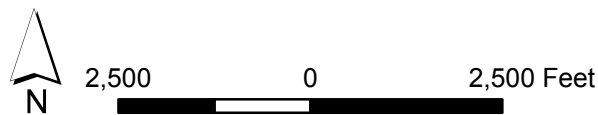


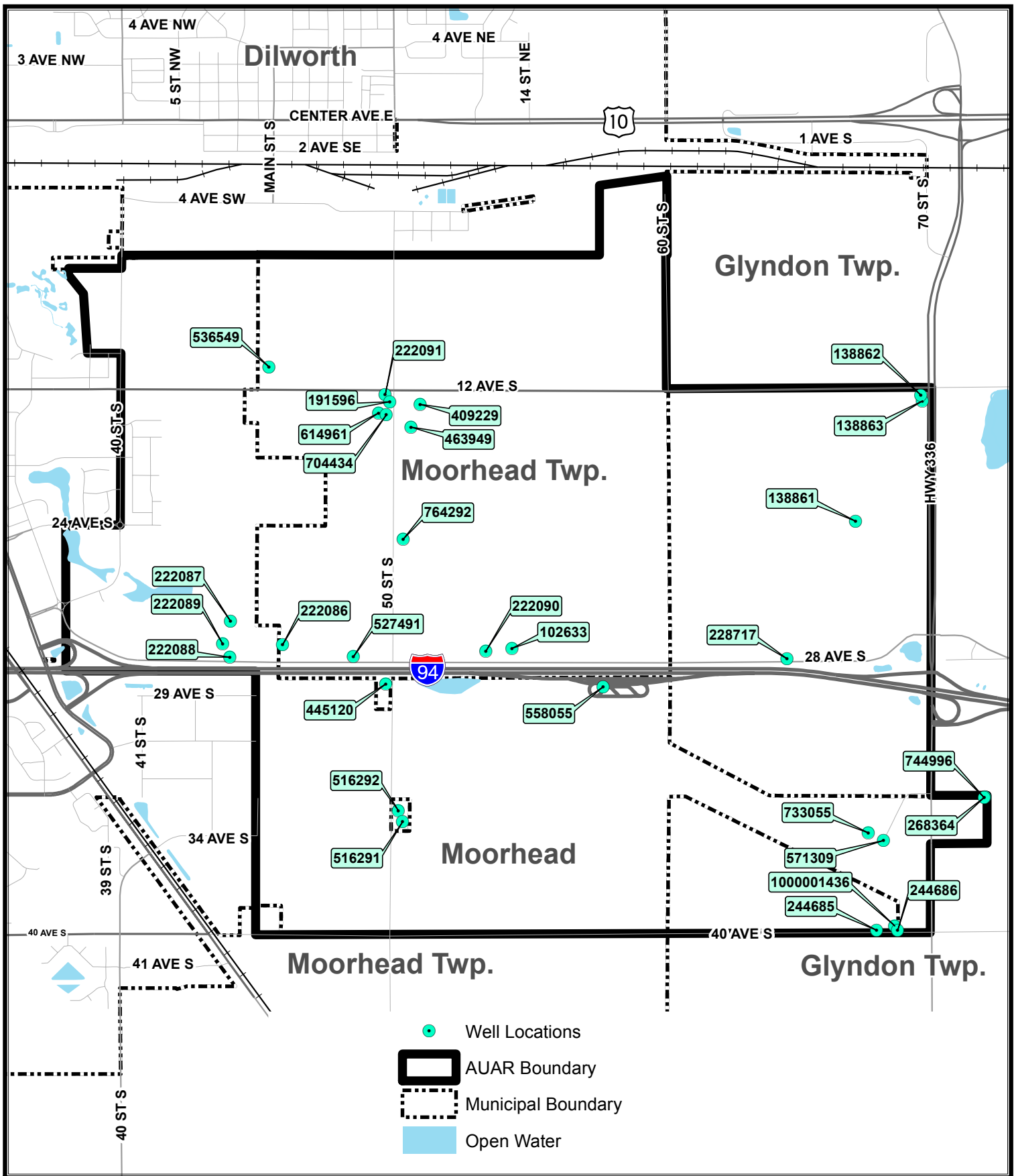


Surface Water
East Moorhead/Dilworth AUAR

Figure 11-1

September 1, 2017





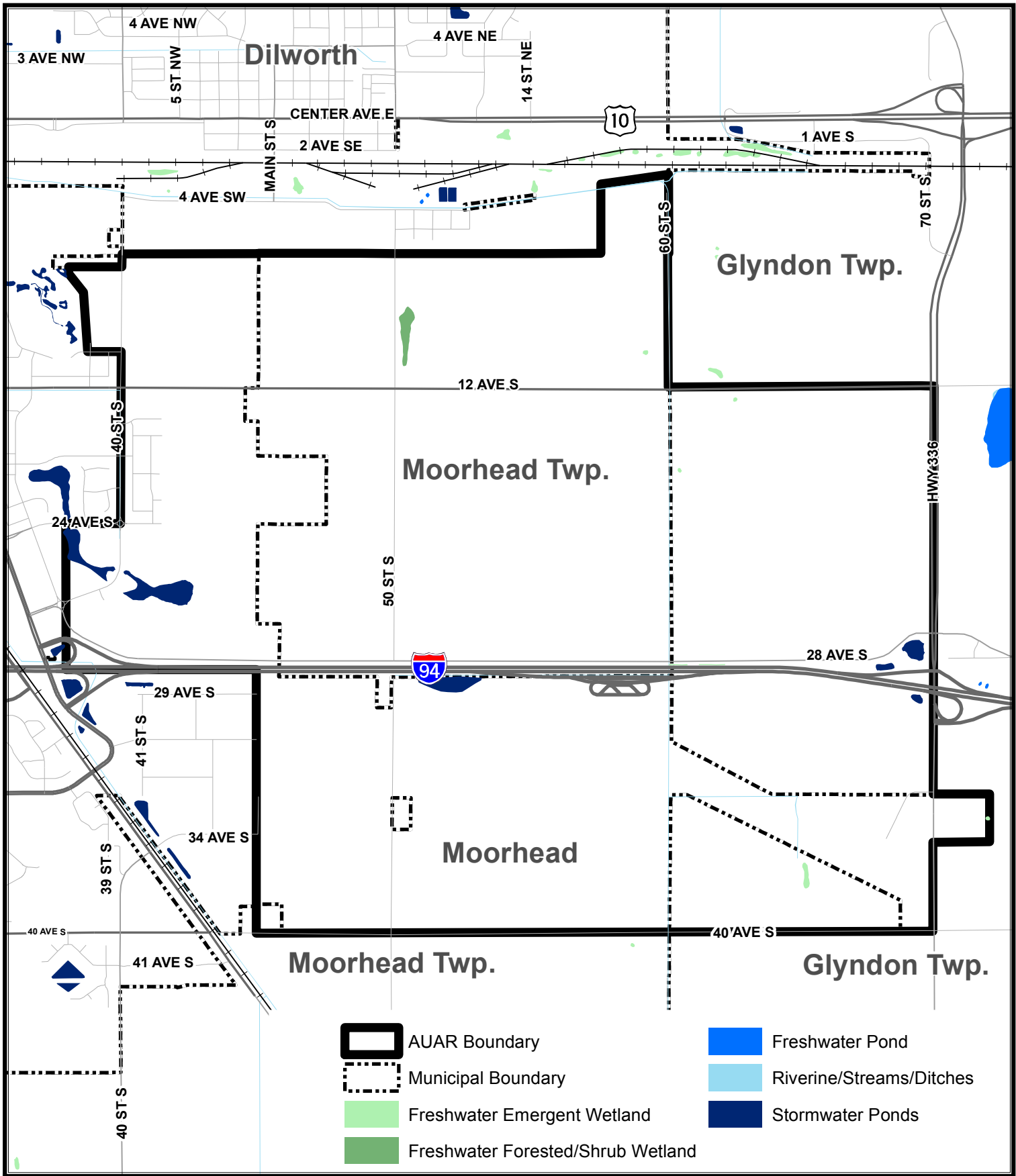
Well Locations

East Moorhead/Dilworth AUAR

Figure 11-2

August 9, 2017

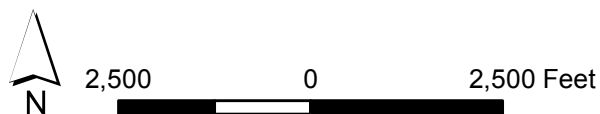




Surface Water and Wetland
East Moorhead/Dilworth AUAR

Figure 11-3

July 24, 2017



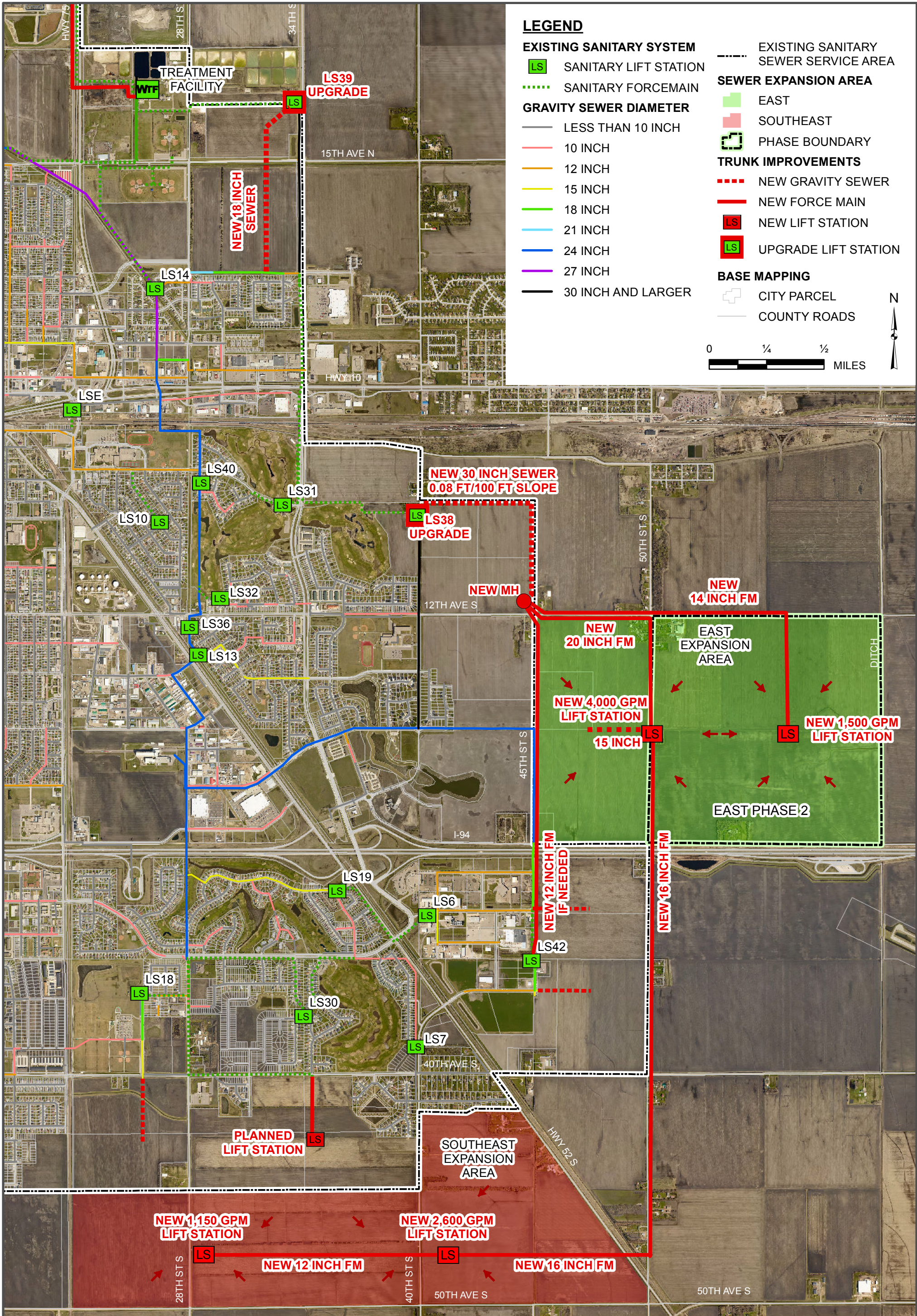


FIGURE 11-4 - EAST (PHASE 2) & SOUTHEAST SERVICE EXPANSION
AREAS CITY OF MOORHEAD SANITARY SEWER SYSTEM

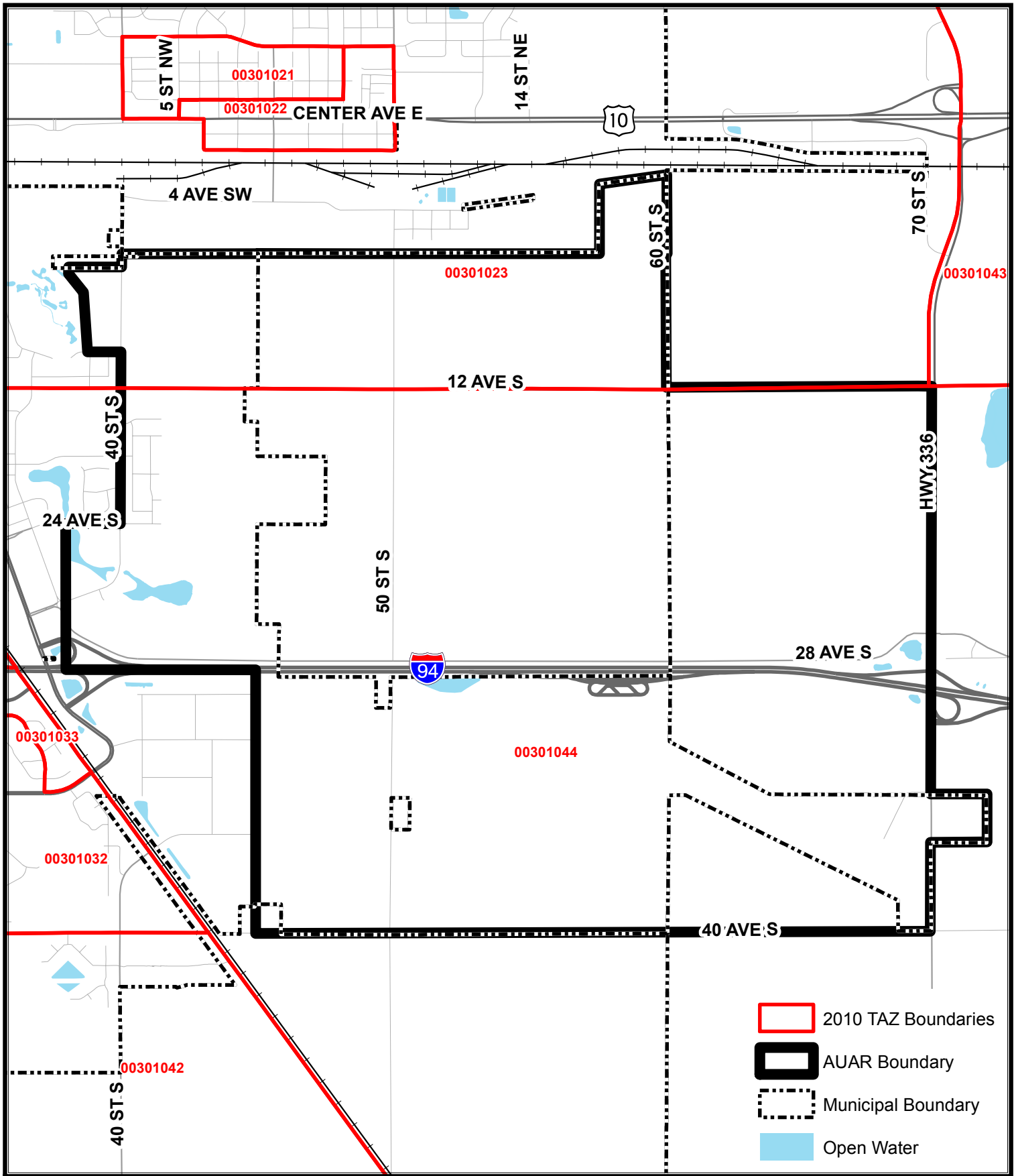


2335 Highway 36 West
 Saint Paul, MN 55113
 651.636.4600

MARCH 2017

The information on this map has been compiled by Stantec staff from a variety of sources and is subject to change without notice. Stantec makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information.

V:\1938\active\193803033\GIS\Projects\Figure 5 - 2017 East Phase 2 and SE Expansion.mxd

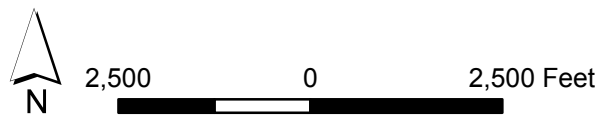


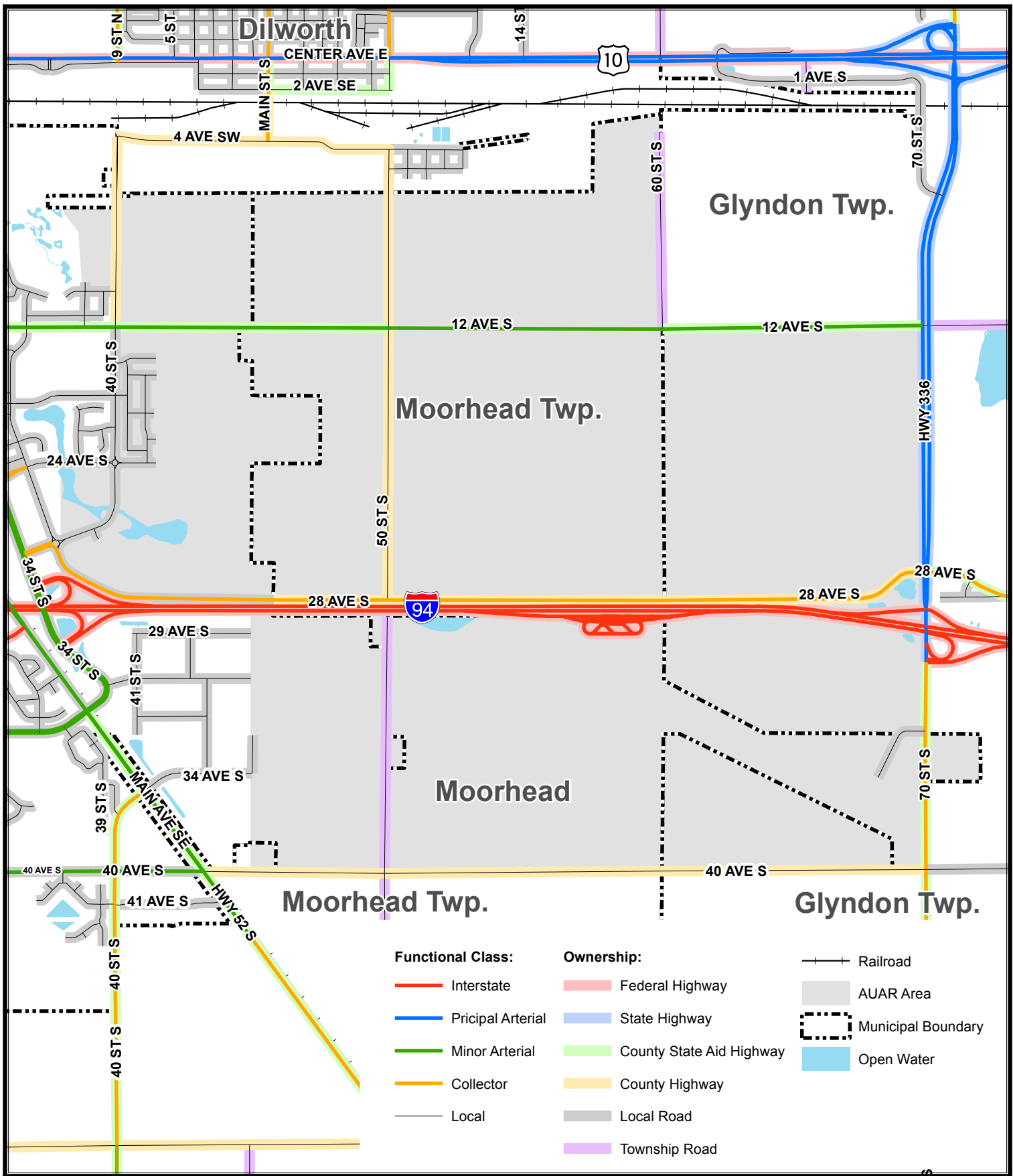
Traffic Analysis Zones (TAZs)

East Moorhead/Dilworth AUAR

Figure 18-1

June 6, 2017





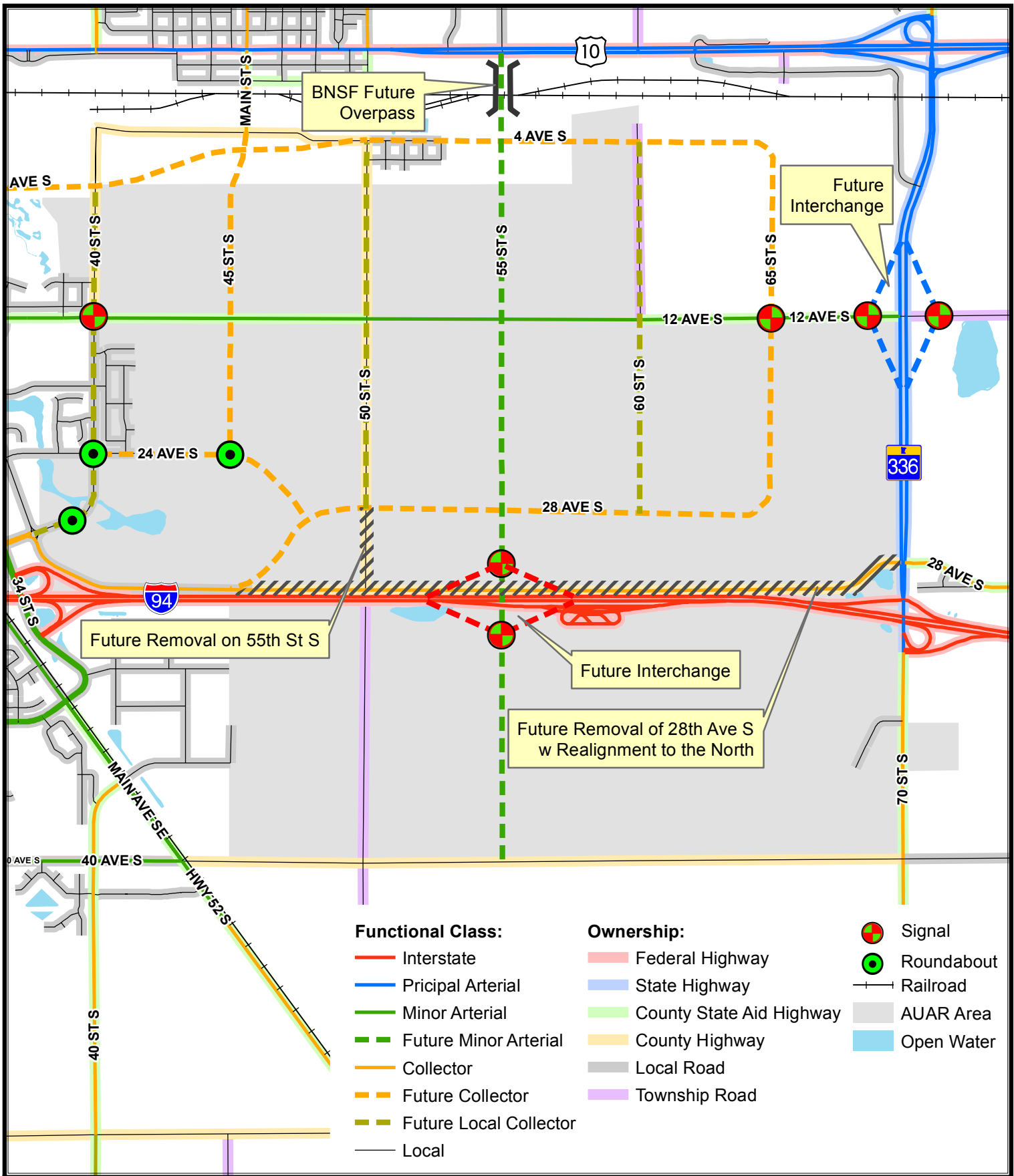
Existing Transportation System

East Moorhead/Dilworth AUAR

Figure 18.2

December 15, 2017





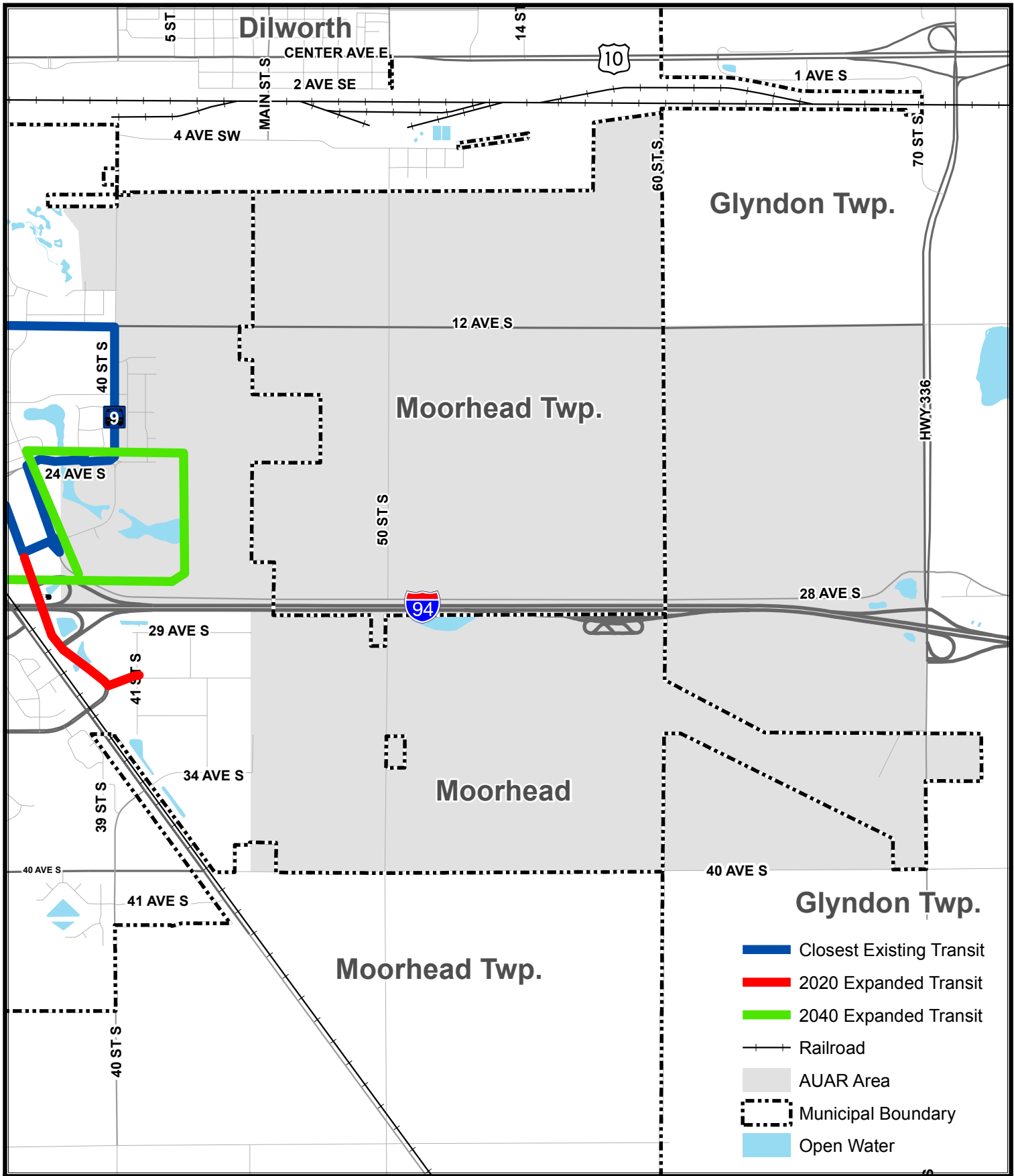
Proposed Transportation System

East Moorhead/Dilworth AUAR

Figure 18.3

December 15, 2017





Transit Map

East Moorhead/Dilworth AUAR

Figure 18.4

January 4, 2018



Appendix B – National Land Cover Database Classification Descriptions

Class\ Value	Classification Description
Water	
11	Open Water - areas of open water, generally with less than 25% cover of vegetation or soil.
12	Perennial Ice/Snow - areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.
Developed	
21	Developed, Open Space - areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	Developed, Low Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23	Developed, Medium Intensity -areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
24	Developed High Intensity -highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
Barren	
31	Barren Land (Rock/Sand/Clay) - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
Forest	
41	Deciduous Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
42	Evergreen Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
43	Mixed Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
Shrubland	
51	Dwarf Scrub - Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.
52	Shrub/Scrub - areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Herbaceous	
71	Grassland/Herbaceous - areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
72	Sedge/Herbaceous - Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.
73	Lichens - Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.
74	Moss - Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.
Planted/Cultivated	
81	Pasture/Hay -areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
82	Cultivated Crops -areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.
Wetlands	
90	Woody Wetlands - areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
95	Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Appendix C - Draft AUAR Comment Letters



**Ecological and Water Resources
2115 Birchmont Beach Rd NE
Bemidji, MN 56601**

August 28, 2018

Kristie Leshovsky & Bob Zimmerman
City Planner and Zoning Administrator & City Engineer
City of Moorhead
Moorhead City Hall
500 Center Ave, Box 779
Moorhead, MN 56561

East Moorhead Growth Area Plan Draft AUAR, Clay County MN

Ms. Leshovsky and Mr. Zimmerman,

Thank you for the opportunity to review the East Moorhead Growth Area Plan draft Alternative Urban Area Review (AUAR). We applaud you for looking to the future in your planning and city growth at a citywide level.

After reviewing the draft AUAR for the East Growth Area Plan we have the following comments and recommendations:

Environmental Analysis document, form and content

While this document is a great planning tool, the document does not appear to provide sufficient level of detail as indicated in MN Rule 4410.3610, Subp 4. Including additional details on associated flood damage reduction projects, ditching, and other items will help flesh-out the document to more fully describe potential impacts of development.

To ensure consistency with MN rule 4410.3610, Subp 5C, DNR recommends creating a stand-alone mitigation document that can be referenced quickly and easily during future build-out. Providing a more specific stand-alone mitigation plan will help to ensure mitigation is followed.

Wildlife and Rare Features

The City of Moorhead is licensed to access to the Natural Heritage Information System (NHIS) for rare species accounts. DNR recommends noting if NHIS was reviewed to clarify if this AUAR has the most current rare species information.

The rusty patched bumble bee (*Bombus affinis*), a federally-listed endangered species, was just recently documented in the vicinity of the proposed project; likely added after your last NHIS data update and therefore not included. The rusty patched bumble bee typically occurs in grasslands and urban gardens with flowering plants from April through October. This species nests underground in abandoned rodent cavities or in clumps of grasses. Please reference the guidance at the [USFWS rusty patched bumble bee website](#) to determine if the project has the potential to impact this protected species.

The AUAR currently states there are no mapped Sites of Biodiversity Significance within the AUAR or immediate vicinity. However, an internal review by DNR staff found one Rail Road Right-of-Way prairie along the western edge of the AUAR area. This habitat is listed as wet prairie (northern type), of Moderate Biodiversity Significance, and is vulnerable to extirpation. The railroad crossing along 50th Ave S will likely have some impact on this habitat and should be noted.

Finally, several of the species noted in the rare features section includes pollinator species. In a recent tour of the proposed Fargo-Moorhead Diversion, city staff pointed out the City's commitment to planting native prairie species. If Moorhead plans to continue this use of native landscaping in city parks and infrastructure, it may be appropriate to list this as a mitigation measure within this section of the document. Additional encouragement of landowners to plant native species in stormwater retention ponds and landscaping may also be appropriate mitigation measures.

Water appropriation

The AUAR does a good job at describing some of the challenges of appropriating water from the Moorhead Aquifer. However, there is concern that transitioning appropriation to utilize more of the Buffalo Aquifer and Red River may be problematic for the aquatic resource. The Buffalo Aquifer has a history of overuse, leading to long-term declining water levels trends. Appropriation from the Red River may also be limited during periods of drought.

Moorhead Public Service (MPS) and DNR began working together in 2008 to develop long-term drought planning to limit impacts on the Buffalo Aquifer if the surface water was in short supply. The team drafted the Buffalo Aquifer management plan updated last in 2016. The numbers noted in this management plan for projected water use are not consistent with those found in the AUAR, but are much more conservative (an estimated higher use). DNR recommends the city reference the Buffalo Aquifer plan, the concerns noted in the plan, the multi-agency work to protect this aquifer, and the projected numbers associated with this plan and how they differ from projections in the AUAR.

Due to recent declining water level trends in the Moorhead and Buffalo aquifers and the desire to increase appropriation from groundwater, DNR recommends the following mitigation items:

- Additional groundwater monitoring of both aquifers
- Water conservation measures in the mitigation plan as preventative, rather than reactionary mitigation measures. With the existing water supplies at limited supply, implementing water conservation through sprinkling limitations, waterline leak detection, encouraging drought tolerant landscaping, and water-conservation centered fee scheduling are all recommended measures to implement as Moorhead expands.
- DNR recommends the City of Moorhead seek alternative water supplies should the monitoring indicate increased use of the aquifers will be sustainable.
- Continued work with DNR to model and predict aquifer sustainability in response to appropriations.

Stormwater

DNR recommends the AUAR describe any work on flood damage reduction projects within and around the AUAR that affect this area. Please indicate whether the Fargo-Moorhead Diversion project will influence development within the AUAR area.

DNR also recommends the AUAR provide maps of the designated floodway and flood fringe zones on the proposed development map. Would zoning change with potential flood protection projects such as the Fargo-Moorhead Diversion? Additional descriptions of mitigation for development within the floodplain such as flood resistant structure requirements, limiting development density, and prohibition of fill are also recommended as part of the mitigation plan.

Surface waters

The potential impacts to surface water are well described. However, DNR recommends clarifying if any upgrades will be required for Clay County Ditch 41 and if any additional ditches will be required for development.

DNR also recommends non-stormwater related mitigation strategies such as vegetated buffers, construction erosion control, and coordination with watershed district staff on water quality issues.

Plans

This section should also discuss how the AUAR proposes to be consistent with the [Upper Red River of the North Watershed Restoration and Protection Strategies](#).

Cumulative effects

Noteworthy potential cumulative concerns seen within the Moorhead area are both the impacts to surface water from run-off and encroachment onto the floodplain and the additional strains on the Moorhead and Buffalo aquifers. DNR recommends the geographic scale of cumulative potential effects be revised accordingly. The Buffalo Aquifer management plan also should be used as a source in describing potential cumulative effects.

Items that DNR recommends be included in this section include:

- DNR is currently reviewing the Dam Safety permit application for the Fargo-Moorhead Diversion, and is therefore likely a reasonably foreseeable project.
- DNR is also currently reviewing two other AUAR's by the City of Moorhead. These AUAR's mention specific items such as changes to groundwater appropriation and infrastructure and therefore may be also considered reasonably foreseeable projects.
- DNR has concerns with cumulative impacts of groundwater use, and recommends including further description of groundwater issues within the area. This could also include a write-up of how the City of Moorhead, MPS, and DNR are collaborating on finding a sustainable water supply for the City. The collaboration includes building of the Buffalo aquifer model, sharing this model and data with DNR to facilitate our allocation of water resources, and continued meetings and discussions.
- Any planned and reasonably foreseeable flood damage reduction projects including in-town levees, and drainage projects should also be included in this section.

Thank you for the review of this draft AUAR. We hope you find our comments helpful and look forward to working with you in conservation.

Sincerely,



Nathan Kestner
NW Regional Manager
Ecological and Water Resources

CC: Jaimé Thibodeaux, Environmental Assessment Ecologists
Lisa Joyal, Endangered Species Review Coordinator
Rodger Hemphill, Area Hydrologist
Joshua Proski, Groundwater Hydrologist
Jennifer Rose, Groundwater Specialist

Equal Opportunity Employer

August 28, 2018

Ms. Kristie Leshovsky
City Planner and Zoning Administrator
City of Moorhead
500 Center Avenue, Box 779
Moorhead, MN 56561

RE: AUAR – Moorhead East Growth Area
Moorhead, Clay County
SHPO Number: 2018-2566

Dear Ms. Leshovsky:

Thank you for providing this office with a copy of the Alternative Urban Areawide Review (AUAR) for the above-referenced development area.

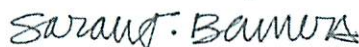
Due to the nature and location of the proposed development, we recommend that a Phase IA literature review and archaeological assessment be completed to assess the potential for intact archaeological sites in the development area. If, as a result of this assessment, a Phase I archaeological survey is recommended, this survey should be completed. The survey must meet the requirements of the Secretary of the Interior's Standards for Identification and Evaluation, and should include an evaluation of National Register eligibility for any properties that are identified. For a list of consultants who have expressed an interest in undertaking this type of research and archaeological surveys, please visit the website preservationdirectory.mnhs.org, and select "Archaeologists" in the "Search by Specialties" box.

We will reconsider the need for survey if the development area can be documented as previously surveyed or disturbed. Any previous survey work must meet contemporary standards. **Note:** plowed areas and right-of-way are not automatically considered disturbed. Archaeological sites can remain intact beneath the plow zone and in undisturbed portions of the right-of-way.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If any future projects are considered for federal financial assistance, or require a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency. Be advised that comments and recommendations provided by our office for this review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

If you have any questions regarding our review of this AUAR, please contact David Mather, National Register Archaeologist, at (651) 201-3289.

Sincerely,



Sarah J. Beimers
Environmental Review Program Manager

August 28, 2018

Beth Elliott
Senior Urban Planner
Stantec Consulting
2553 Highway 36 West
St. Paul, MN 55113

RE: Moorhead East Growth Area Plan, Clay County

Dear Ms. Elliott:

Thank you for the opportunity to comment on the above listed project. Because numerous archaeological sites exist in the area of the proposed project, I recommend that a qualified archaeologist conduct background research and (if necessary) an archaeological survey to determine if the proposed project could impact unrecorded archaeological or cemetery sites. The Minnesota Historical Society maintains a list of qualified archaeologists at: <http://www.mnhs.org/preservation/directory>.

The Office of the State Archaeologist reviewed this project under the Minnesota Field Archaeology Act (MS 138.31 - .41), the Private Cemeteries Act (MS 307.08), and the Minnesota Environmental Policy Act (MS 116D).

Sincerely,



Amanda Gronhovd
State Archaeologist
200 Tower Avenue
Fort Snelling History Center
St. Paul, MN 55111
Amanda.Gronhovd@State.MN.US
612-725-2411

August 28, 2018

Kristi Leshovsky
City Planner and Zoning Administrator
City of Moorhead
500 Center Avenue, Box 779
Moorhead, MN 56561

Re: Moorhead East Growth Area Alternative Urban Areawide Review

Dear Kristi Leshovsky:

Thank you for the opportunity to review and comment on the Alternative Urban Areawide Review (AUAR) for Moorhead East Growth Area project (Project) in the city of Moorhead, Clay County, Minnesota. The Project consists of a 4,000 acre development in east Moorhead Township and the southern portion of the city of Dilworth. Regarding matters for which the Minnesota Pollution Control Agency (MPCA) has regulatory responsibility or other interests, the MPCA staff has the following comments for your consideration.

Permits and Approvals Required (Item 8)

- Please note that if a Clean Water Act Section 401 Water Quality Certification is required due to wetland impacts, an Antidegradation Assessment, as a requirement and part of the 401 Water Quality Certification, is also required. For further information about the 401 Water Quality Certification process, please contact Bill Wilde at 651-757-2825 or William.wilde@state.mn.us.
- This section indicates that a sanitary sewer extension permit is required and the possibility that expansion of the wastewater treatment facility may be necessary. The MPCA recommends these future needs be communicated to the wastewater treatment facility by the Project proposer. Questions on the sanitary sewer extension permit process should be directed to Corey Mathisen at 651-757-2554 or Corey.Mathisen@state.mn.us.

Water Resources (Item 11)

Stormwater

- The MPCA suggests utilizing [Better Site Design](#) concepts found in the Minnesota Stormwater Manual to maintain pre-development hydrology for the development by reducing the amount of new impervious surfaces that will result in increased flows to the Red River of the North. This includes the use of infiltration areas to keep water on the site wherever possible. Where infiltration is prohibited due to high water tables or contaminated soils, consider water harvest and reuse practices.
- The existing wetlands on the site may not be utilized for stormwater treatment unless they have been mitigated for.
- The MPCA General Construction Stormwater (CSW) permit requires that a minimum of 50 feet of natural buffers are maintained near surface waters (including the wetlands) during and after construction. If construction requires encroachment of any buffer, redundant (double) downgradient sediment controls must be used during the construction. The buffer must be restored with native vegetation upon completion of the construction.

- Due to impairment of the Red River of the North, the construction activity must conform with the Additional Erosion and Sediment control requirements in Appendix A of the CSW permit. This includes a soil stabilization timeline of within 7 days for any portion of the construction where soil disturbance will temporarily or permanently cease for 7 days or more.
- The MPCA requires review and approval of Stormwater Pollution Prevention Plans for construction activities resulting in disturbance of 50 acres or more including Common Plans of Development (one proposed plan where multiple activities occur over time) as defined in the CSW permit. Questions regarding CSW Permit requirements should be directed to Roberta Getman at 507-206-2629 or Roberta.Getman@state.mn.us.

Solid Wastes, Hazardous Wastes, Storage Tanks (Item 12)

Please note that this section of the AUAR is not utilizing the language/discussion points from the current EAW form. The discussion in the current EAW for this section is directed at contamination/hazardous materials/wastes. The MPCA recommends this section of the AUAR be reevaluated using the language/discussion points from the current EAW form available on the EQB website:

<https://www.eqb.state.mn.us/content/eaw-process>.

Low Impact Design

The MPCA advocates the use of Low Impact Design (LID) practices to aid in the minimization of stormwater impacts. LID is a stormwater management approach and site-design technique that emphasizes water infiltration, values water as a resource, and promotes the use of natural systems to treat water runoff. Examples include:

- Special ditches, arranged in a series, that soak up more water
- Vegetated filter strips at the edges of paved surfaces
- Trees or swales between rows of cars
- Residential or commercial rain gardens designed to capture and soak in stormwater
- Porous pavers, concrete, and asphalt for sidewalks and parking lots
- Narrower streets
- Rain barrels and cisterns
- Green roofs

LID concepts may be found in the [State of Minnesota Stormwater Manual](#) dated November 2005 located on the MPCA website at: <http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>.

In addition, the MPCA LID webpage provides a description and examples of LID features such as permeable pavement, rain gardens, and green roofs. Links to other resources on LID are available as well. The website is located at: <https://www.pca.state.mn.us/water/stormwater-management-low-impact-development-and-green-infrastructure>.

We appreciate the opportunity to review this Project. Please provide your specific responses to our comments and notice of decision on the need for an Environmental Impact Statement. Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the Project for the

Kristi Leshovsky
Page 3
August 28, 2018

purpose of pending or future permit action(s) by the MPCA. Ultimately, it is the responsibility of the Project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any questions concerning our review of this AUAR, please contact me by email at Karen.kromar@state.mn.us or by telephone at 651-757-2508.

Sincerely,



Karen Kromar
Project Manager
Environmental Review Unit
Resource Management and Assistance Division

KK:bt

cc: Dan Card, MPCA, St. Paul
Bill Wilde, MPCA, St. Paul
Roberta Getman, MPCA, Rochester
Corey Mathisen, MPCA, St. Paul
Jim Ziegler, MPCA, Detroit Lakes
Beth Elliott, Stantec Consulting

Appendix D - Response to Draft AUAR Comment Letters

Appendix D – Draft East AUAR Response to Comments

AUAR Guidelines: The final AUAR document must indicate a section specifically responding to each timely and substantive comment on the draft that indicates the way in which the comment has been addressed. Similar comments may be combined for purposes of responding.

The Moorhead East Growth Area Draft Alternative Urban Areawide Review (Draft AUAR) was prepared for the City of Moorhead and distributed to the Environmental Quality Board (EQB) and persons and agencies on the official EQB mailing list in accordance with EQB rules on July 23, 2018.

The 30-day comment period expired on August 28, 2018. Four agencies submitted comments on the Draft AUAR. Copies of all comment letters submitted are included in Appendix E in the order shown below.

Agency/Organization/Citizen	Letter Dated	Signatory
Minnesota Department of Administration State Historic Preservation Office	August 28, 2018	Sarah Beimers
Minnesota Department of Administration State Archaeologist	August 28, 2018	Amanda Gronhovd
Minnesota Department of Natural Resources	August 28, 2018	Nathan Kestner
Minnesota Pollution Control Agency	August 28, 2018	Karen Kromar

Responses are generally confined to substantive issues that “address the accuracy and completeness of the information provided in the draft analysis, potential impacts that may warrant further analysis, further information that may be required in order to secure permits for specific projects in the future, and mitigation measures or procedures necessary to prevent significant environmental impacts within the area when actual development occurs” (Minnesota Rules Part 4410.3610, Subp. 5). Although comments and recommendations that do not address these areas do not need to have a response, they have been duly noted for the record and are not necessarily specifically addressed in the responses. As required by MN Rules, the RGU has provided replies to comments that are *substantive* (involving matters with major or practical importance) and where necessary, note any corrections(s) to be made to the appropriate sections of the AUAR or Mitigation Plan. Responses to comments are organized by AUAR Item number.

Item 8 Permits

1. **Comment:** Please note that if a Clean Water Act (CWA) Section 401 Water Quality Certification is required due to wetland impacts, an Antidegradation Assessment, as a requirement and part of the 401 Water Quality Certification, is also required.

Commenting Agency: Minnesota Pollution Control Agency (MPCA)

Response: This has been noted and added to the permits required section of Item 8.

2. **Comment:** This section indicates that a sanitary sewer extension permit is required and the possibility that expansion of the wastewater treatment facility may be necessary. The MPCA recommends these future needs be communicated to the wastewater treatment facility by the Project proposer.

Commenting Agency: MPCA

Response: Noted as part of the record in this document.

Item 11 Water Resources

1. **Comment:** The MPCA suggests utilizing 'Better Site Design' concepts found in the Minnesota Stormwater Manual to maintain pre-development hydrology for the development by reducing the amount of new impervious surfaces that will result in increased flows to the Red River of the North. This includes the use of infiltration areas to keep water on the site wherever possible. Where infiltration is prohibited due to high water tables or contaminated soils, consider water harvest and reuse practices.

Commenting Agency: MPCA

Response: This information has been added.

2. **Comment:** The existing wetlands on the site may not be utilized for stormwater treatment unless they have been mitigated for.

Commenting Agency: MPCA

Response: This information has been added.

3. **Comment:** The MPCA General Construction Stormwater (GCS) permit requires that a minimum of 50 feet of natural buffers are maintained near surface waters

(including wetlands) during and after construction. If construction requires encroachment of any buffer, redundant downgradient sediment controls must be used during construction. The buffer must be restored with native vegetation upon completion of construction.

Commenting Agency: MPCA

Response: This information has been added.

4. **Comment:** Due to impairment of the Red River of the North, the construction activity must conform with the Additional Erosion and Sediment control requirements in Appendix A of the CSW permit. This includes a soil stabilization timeline of within 7 days for any portion of the construction where soil disturbance will temporarily or permanently cease for seven days or more.

Commenting Agency: MPCA

Response: This information has been added.

5. **Comment:** The MPCA requires review and approval of Stormwater Pollution Prevention Plans for construction activities resulting in disturbance of 50 acres or more including Common Plans of Development...as defined in the CSW permit.

Commenting Agency: MPCA

Response: This information has been added.

6. **Comment:** The potential impacts to surface water are well described. However, DNR recommends clarifying if any upgrades will be required for Clay County Ditch 41 and if any additional ditches will be required for development.

Commenting Agency: MDNR

Response: This information has been added.

7. **Comment:** The DNR also recommends non-stormwater related mitigation strategies such as vegetated buffers, construction erosion control, and coordination with watershed district staff on water quality issues.

Commenting Agency: MDNR

Response: This information has been added.

8. **Comment:** DNR recommends the AUAR describe any work on flood damage reduction projects within and around the AUAR that affect this area. Please

indicate whether the Fargo-Moorhead Diversion project will influence development within the AUAR area.

Commenting Agency: MDNR

Response: This information has been added.

9. **Comment:** DNR also recommends the AUAR provide maps of the designated floodway and flood fringe zones on the proposed development map. Would zoning change with potential flood protection projects such as the Fargo-Moorhead Diversion? Additional descriptions of mitigation for development within the floodplain such as flood resistant structure requirements, limiting development density, and prohibition of fill are also recommended as part of the mitigation plan.

Commenting Agency: MDNR

Response: This information has been added.

10. **Comment:** The MPCA advocates the use of Low Impact Design (LID) practices to aid in the minimization of stormwater impacts. LID is a stormwater management approach and site-design technique that emphasizes water infiltration, values water as a resource, and promotes the use of natural systems to treat water runoff.

Commenting Agency: MPCA

Response: The above has been taken into consideration and language regarding LID was incorporated into the AUAR.

Item 12 Solid Wastes, Hazardous Wastes, Storage Tanks

1. **Comment:** Please note that this section of the AUAR is not utilizing the language/discussion points from the current EAW form.

Commenting Agency: MPCA

Response: The question has been updated in the AUAR, and the language has been changed to address the updated question.

Item 13 Wildlife and Rare Features

1. **Comment:** The MDNR recommends noting if NHIS was reviewed to clarify if this AUAR has the most current rare species information.

Commenting Agency: MDNR

Response: This information was already included in the Draft AUAR. Stantec conducted a review of the NHIS database under license agreement L-876.

2. **Comment:** The rusty patched bumble bee... was just recently documented in the vicinity of the proposed project... Please reference the guidance with the USFWS rusty patched bumble bee website to determine if the project has the potential to impact this protected species.

Commenting Agency: MDNR

Response: A search of the USFWS Rusty Patched Bumble Bee (RPBB) Map (<https://www.fws.gov/midwest/conservation/insects/rpbb/rpbbmap.html>) did not reveal documentation of the RPBB within the AUAR area; however, it is understood that the MDNR data may be more up-to-date than the USFWS data. Language has been added to this section to address the potential for the RPBB to occur within the AUAR area, including mitigation strategies, planting of native species for pollinators, and the potential for species-specific surveys.

3. **Comment:** The AUAR currently states there are no mapped Sites of Biodiversity Significance within the AUAR or immediate vicinity. However, ...one Rail Road Right-of-Way prairie [exists] along the western edge of the AUAR area... The railroad crossing along 50th Ave S will likely have some impact on this habitat and should be noted.

Commenting Agency: MDNR

Response: The AUAR language has been updated to state that there are no mapped Sites of Biodiversity Significance within the AUAR area. Additional language addressing the potential impacts to the prairie associated with improvements to 50th Avenue South were added to this section.

4. **Comment:** ...If Moorhead plans to continue [the use of planting native prairie species as landscaping] in the city parks and infrastructure, it may be appropriate to list this as a mitigation measure within this section of the document. Additional encouragement of landowners to plant native species in stormwater retention ponds and landscaping may also be appropriate mitigation measures.

Commenting Agency: MDNR

Response: This has been addressed in the section described above regarding the RPBB.

Item 14 Historic Properties

1. **Comment:** Due to the nature and location of the proposed development, we recommend that a Phase IA literature review and archaeological assessment be completed to assess the potential for intact archaeological sites in the development area. If, as a result of this assessment, a Phase I archaeological survey is recommended, this survey should be completed.

Commenting Agency: MDA – SHPO

Response: No archaeological surveys were conducted during the preparation of the AUAR as no specific development is planned at this time. However, the preparer recognizes the concerns of the MNSHPO, and has added language to the AUAR stating that all appropriate literature reviews and archaeological assessments should be completed prior to site development. Furthermore, coordination with the MNSHPO during development was recommended.

2. **Comment:** Because numerous archaeological sites exist in the area of the proposed project, I recommend that a qualified archaeologist conduct background research and (if necessary) an archaeological survey to determine if the proposed project could impact unrecorded archaeological or cemetery sites.

Commenting Agency: MDA – State Archaeologist

Response: No archaeological surveys were conducted during the preparation of the AUAR as no specific development is planned at this time. However, the preparer recognizes the concerns of the MNSHPO, and has added language to the AUAR stating that all appropriate literature reviews and archaeological assessments should be completed prior to site development. Furthermore, coordination with the MNSHPO during development was recommended.

Item 19 Cumulative Effects

1. **Comment:** Noteworthy potential cumulative concerns seen within the Moorhead area are both the impacts to surface water from run-off and encroachment onto the floodplain and the additional strains on the Moorhead and Buffalo aquifers. DNR recommends the geographic scale of cumulative potential effects be revised accordingly. The Buffalo Aquifer management plan also should be used as a source in describing potential cumulative effects. Items that DNR recommends be included in this section include:
 - DNR is currently reviewing the Dam Safety permit application for the Fargo-Moorhead Diversion, and is therefore likely a reasonably foreseeable project.

- DNR is also currently reviewing two other AUAR's by the City of Moorhead. These AUAR's mention specific items such as changes to groundwater appropriation and infrastructure and therefore may be also considered reasonably foreseeable projects.
- DNR has concerns with cumulative impacts of groundwater use, and recommends including further description of groundwater issues within the area. This could also include a write-up of how the City of Moorhead, MPS, and DNR are collaborating on finding a sustainable water supply for the City. The collaboration includes building of the Buffalo aquifer model, sharing this model and data with DNR to facilitate our allocation of water resources, and continued meetings and discussions.
- Any planned and reasonably foreseeable flood damage reduction projects including in-town levees, and drainage projects should also be included in this section.

Commenting Agency: MDNR

Response: The above has been taken into consideration and language was added to the AUAR to include and address these additional potential cumulative concerns.