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2040 Comprehensive Surface Water Management Plan Elko New Market, MN

Submitted by:

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Certification

2040 Comprehensive Surface Water Management Plan

for

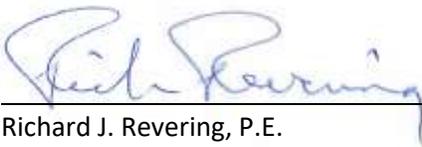
The City of Elko New Market

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December 2019

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

By:



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Date: 12/17/19

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I. EXECUTIVE SUMMARY

The City of Elko New Market's Comprehensive Surface Water Management Plan (Plan) was modeled after Minnesota Rules Chapter 8410 (Metropolitan Area Local Water Management), Minnesota Statutes Section 103B.235, the Scott Watershed Management Organization (WMO) Comprehensive Water Resource Management Plan (CWRMP) and the Vermillion River Watershed Management Plan (VRWMP). The City of Elko New Market (City) will utilize this Plan, the accompanying Rules, and the existing and new Ordinances as the basis for managing wetlands, surface, storm, flood, and groundwater within the municipal boundary.

This Plan, accompanying Rules, and Ordinances, when adopted in conjunction with the Scott CWRMP and the VRWMP, will provide the management goals, policies, and objectives the City will implement to protect, improve, and preserve wetlands, surface, storm, flood, and groundwater resources within the City. It will also address the topics required to meet the Scott WMO CWRMP and the VRWMP criteria for a Local Water Plan for submittal, acceptance, and approval under Minnesota Statutes 103B and Minnesota Rule 8410.

The Plan has been prepared with cooperation of Scott and Dakota County staff, the City of Elko New Market Staff, and the Elko New Market City Council to address the concern for the City's wetlands, surface, storm, flood, and groundwater impacts resulting from continued development and growth both in and adjacent to the City of Elko New Market.

Elko New Market is situated in a unique area geographically in that the study area sits at the headwaters of three watersheds: 1) Vermillion River, 2) Sand Creek (via Porter Creek and Duck Creek), and 3) the Cannon River. There are four Department of Natural Resources protected wetlands within the City limits and numerous smaller wetlands. There are no major water bodies or rivers in the City. Given this, the City's protection of land and resources during the planning and design of development will affect downstream resources. To protect natural communities the natural resources and environmental conservation goals of the current Southeast Scott County Comprehensive Plan will be included in the City's 2040 update and ordinances adopted that will implement the standards of the Scott WMO and VRWMP.

This Plan addresses various methods of ensuring that continued growth and development does not adversely affect the City's natural resources as well as the existing storm sewer, open channel, and regional pond networks. Acceptance of this Plan by the Scott WMO and the VRWJPO identifies the City of Elko New Market as the Local Government Unit (LGU) for matters related to protection, preservation, use, and regulation of surface and groundwater resources. In addition, this Plan includes a review of the surface water related costs associated with continued development in the City. It identifies a basis and a methodology for storm sewer infrastructure related charges associated with the corresponding development and provides a framework for managing the City's natural resources in relation to continued development and urban growth. The costs and regulatory efforts are proportional to the burdens that urban developments place on existing and future public infrastructure as well as the City's natural resources. Given this information, the findings and goals of this Plan are summarized as follows:

- The majority of the existing storm sewer and regional detention basin networks serving the developed portion of the City are adequately sized to accommodate the design storm runoff from the existing service area given current land use data. Further information on the hydrologic model is available upon request by the City Engineer.
- The existing storm sewer conveyance and regional detention systems do not have capacity to accommodate future development within the City's ultimate growth boundary.
- The existing natural resources within the City must be preserved while accommodating the

projected growth and development. The City's goal for wetland management is for no net loss of wetland area. The City looks forward to working with Scott WMO and the Minnesota Pollution Control Agency (MPCA) in developing the Total Maximum Daily Load (TMDL) concentrations for Porter Creek. The groundwater resources in the City will be managed in conjunction with Minnesota Department of Health (MDH) through the Wellhead Protection Plan (WHPP).

- Although there are numerous alternative methods of accommodating future development and growth, the City is advocating the continued design and construction of localized detention basins as the preferred BMPs for water quality and rate control associated with future development in the City's outlying growth areas.
- Localized detention basins are advocated because of a number of benefits. They are the most easily adapted to unforeseen changes in development design and layout. They can accommodate changes in the rate and location of development. They require no investment in land rights, pipes sized for un-attenuated peak runoff from development, or pond construction in advance of development and the associated fee revenue that would be required to create the facilities. They facilitate development stormwater design that more closely mimics existing hydrologic and hydraulic conditions. They do reduce developable acreage within developments, but the local approach also means stormwater area charges to developers can be much lower.
- Due to the amount of data contained in the Hydrologic modeling files (HydroCAD), detailed information including surface areas, storage volumes, flow rates for the existing conditions, etc. will be available upon request and modified as required to account for future development and provide the required level of service.
- An estimate of the costs associated with the facilities to be funded with storm water area charges has been included in this Plan. The SWAC is a per-acre fee that is collected from developers based on projected costs. The SWAC should be reviewed and adjusted on an annual basis for inflation or other factors.
- This Plan is a document-in-progress and will be amended as required. Annually as development occurs the hydrologic model will be reviewed and modified to account for the differences between the actual and modeled hydrologic conditions. It is anticipated that, as development layouts are submitted for review, the proposed storm sewer and detention pond improvements can be temporarily entered into the hydrologic model and analyzed for possible adverse effects on the area hydrology. If accepted and constructed, these improvements will then be permanently entered into the comprehensive hydraulic and hydrologic model as an existing condition.

II. PURPOSE

This Plan, in conjunction with the Scott WMO CWRMP and the VRWMP, satisfies the requirements of MN Statute 103B.205 to 103B.255 – Local Water Management Plans and MN Rule-8410 – Local Water Management.

The overall purpose of this plan is to protect, preserve, and manage surface and groundwater systems within the City while accommodating rapid municipal, residential, commercial development, and agricultural activity. This Plan outlines sustainable and equitable means to effectively reach this goal. This Plan provides goals, policies, guidance, and specific standards for decision-makers, residents, landowners, and City personnel.

This submittal is a culmination of many months of research, mapping, land use analysis, planning, and hydrologic and hydraulic design. The end product is a comprehensive design tool that may be

used by the City for managing growth and planning for future public infrastructure construction. Approximately 180 City watersheds were identified and modeled as part of this Plan and are available to City staff for reference during future development plan reviews. This Plan is not a “stand-alone” document and should only be utilized in conjunction with the Scott WMO CWRMP and the VRWMP.

This Plan represents a technical report and includes a large amount of detailed design data. The accompanying overall Watershed Drainage District map (Figure No. 1) identifies major watershed boundaries and major water bodies along with identify minor subwatersheds, contours, proposed storm sewer improvements, and regional development detention basin locations. This map serves as an overview of the entire system and proposed stormwater improvements.

The maps identify the present land use conditions and the proposed drainage conditions required to accommodate anticipated development within the City defined growth boundary. A summary of the hydrologic modeling data for the 2-, 10- and 100-year, 24-hour storm events is available from the City Engineer.

A. Hydrologic Methodology

The hydrologic analysis utilized in this Plan has been performed using the HydroCAD Modeling Software as developed by HydroCAD software solutions, LLC. The model is based on SCS TR-20. The SCS TR-20 methodology is widely accepted among water resource engineers across the United States. The SCS procedure is based on a standard rainfall hydrograph, which is modified by site-specific parameters (i.e., rainfall amount, soil type, ground cover, time of concentration, time to peak flow, etc.).

Information such as pond storage volumes, runoff slopes, drainage areas and ditch locations were compiled directly from the topographic maps. Topographic slope information was used to calculate the time of concentration for each sub-watershed, a critical parameter in the hydrological analysis. Soil cover was compiled from review of orthographic photos obtained from Scott County.

The SCS defines the time of concentration as the total travel time of a particle of water from the hydraulically most distant point in the watershed to the outlet itself. The time of concentration was tabulated for each sub-basin by breaking the sub-basin flow length into regions of sheet flow, shallow concentrated flow, and channel flow, if applicable. A separate time of concentration was computed for each length, with the summation resulting in the total time of concentration for each sub-basin.

The effects of a 2-year (2.8-inch), 10-year (4.2-inch), and 100-year (6.0-inch), 24-hour storm events for the Scott WMO portion of the watershed, and the 1-year (2.4-inch), 10-year (4.2-inch) and 100-year (6.0-inch), 24-hour storm events were analyzed for the VRWJPO portion of the watershed in the 2008 comprehensive plan. Conceptually, the 1-year storm event has a 100 percent chance of occurring in any given year, the 2-year storm event has a 50 percent chance, the 10-year storm event has a 10 percent chance and the 100-year storm event has a 1 percent chance of occurring in any given year.

For future development purposes the Atlas 14 distribution MSE 3 rainfall depths will be used for quantifying stormwater runoff.

Project specific detention basin design procedure requires ponds to be sized to ensure there is no net increase in off-site flow rates for specific storm events. This procedure will minimize adverse effects to downstream properties. Unfortunately, when this procedure is applied to individual development sites without comprehensive review of regional drainage patterns the cumulative effect may be to inadvertently increase downstream flow conditions and possibly cause flooding at some locations. The use of the City-wide hydrology and hydraulic model is suggested as a way to review cumulative impacts of development.

Based on our analysis, the existing pond and culvert system will function properly for storm events less than or equal to the 100-year, 24-hour storm. However, for future detention and water quality ponds the 100-year storm events will need to be managed to prevent damage to the downstream properties. This may be accomplished by volume controls, proper siting of improvements, consideration and protection of natural resources, constructing emergency spillways, increased pond storage volume, and/or adoption of low-impact site design practices. All of these options can be implemented while protecting the natural features of the City.

B. Water Resource Management Responsibilities and Related Regulatory Responsibilities

The City of Elko New Market (City) will be assuming regulatory authority for development while recognizing the role of other local, state, and federal entities. Several entities will have administrative responsibilities within the planning area. For a local water management effort to be successful, each entity's commitment and role must be clearly understood. The agencies currently having some level of administration responsibility include the City, Scott WMO, VRWJPO, Scott County, Minnesota Department of Natural Resources (Mn/DNR), Minnesota Pollution Control Agency (MPCA), the U.S. Army Corps of Engineers (USACE), and the Board of Water and Soil Resources (BWSR). It has been recognized that regulatory agencies can achieve common goals by joining together to combine already scarce financial and regulatory resources.

Intergovernmental cooperation is an excellent tool to address natural resource protection. This is due to the fact that natural resources do not recognize political boundaries and are often located across local, state, and federal regulatory boundaries. The City is ultimately responsible for planning, permitting, construction, maintenance, and other projects related to the City's surface water and ground water infrastructure and will work in conjunction with other local, state and federal agencies to achieve its goal of sound resource management. The City looks forward to cooperating with intergovernmental agencies in the future if the need should arise.

Items specifically identified in the Scott WMO plan that require City cooperation include:

- Providing Scott WMO assistance with wetland banking opportunities - The City will seek to promote the use of wetland banking for projects within the City over the creation of wetland for mitigation where the size, surroundings, and location of the created wetland provide limited opportunities for success. The City will also seek to promote the creation of wetland banks within the City where the prospects for creating a viable and beneficial wetland are evident.
- Coordination and meeting attendance - The City will send representatives to participate in meetings held by the WMO for the purpose of discussing watershed-wide management issues when specifically invited by the WMO.
- Support Wellhead Protection – The City has an approved wellhead protection plan and is actively implementing provisions in the plan.
- MS4 Maintenance Requirements – The City is implementing BMPs and maintenance requirements in accordance with its SWPPP and permit.
- Technical Advisory Committee – The City participates in this committee. See bullet no. 2 above.
- Share Data and Information – The City will cooperate with Scott WMO and other agencies in sharing information.

The major task of administering this plan will be in the permitting process. It is the intent

of the City to assume the role of permitting for all land alteration, thereby enforcing the policies and standards of this Plan. The City's existing permit procedures include surface water management elements outlined in this Plan and the current Environmental Protection Ordinance. Surface water management elements will be reviewed at the same time all other permits are reviewed.

To ensure conformance to this Plan and the associated Rules, the City's preliminary and final platting process and site plan approval process will require more detailed information. Erosion control, water quality, and other pertinent information such as stormwater rate and volume control, regarding local plan standards are among the elements that will be addressed on preliminary and final plans and/or preliminary plats. Conditional approvals by the Planning Commission and/or City Council must require the incorporation of conditional elements into the final plan to ensure compliance.

The revised plan will then be re-distributed to City staff to confirm the inclusion of the provisions under which the plans were approved. The Building Permit issuance process can be the check-point for staff to review final plans for compliance with this Plan and associated Rules while holding the condition of building permit issuance as the incentive. Engineering staff will have a sign-off procedure prior to permit issuance.

The City's administrative responsibilities include, but are not limited to the following:

- Comprehensive Plan update(s);
- Land use regulation;
- Ordinance review and amendment;
- Local plat review and amendments;
- Permits;
- Wetland management as the LGU;
- Sediment and erosion control (Ordinance);
- Groundwater – City wells;
- Participation and cooperation with the programs of the Scott WMO, VRWJPO, Minnesota DNR, and Scott County;
- Hydrologic model update with condition changes;
- Financing Alternatives;
- Capital improvements; and
- Conveyance system and detention pond maintenance;
- Continued Administration of its Stormwater Pollution Prevention Program in accordance with MPCA requirements based on the City's status as a Municipal Separate Storm Sewer Systems (MS4) community.
- Amending its Zoning Ordinance as necessary to establish rules for the implementation of this plan within 120 days following any plan amendments.

Scott WMO and VRWJPO responsibilities and authorities may include but are not limited to the following:

- Monitoring;
- Establishing land use or ordinance requirements;

- Local plan review and approval;
- Review and comment on projects 40 acres and greater in size (VRWJPO);
- Projects of regional significance; and
- Verification of plan implementation.
- Approval of variances.

Metropolitan Council: Comprehensive Plan Amendment

Metropolitan Council has a regional review authority regarding surface water management including:

- Local Plan review; and
- Regional controls related to nonpoint source pollution.

This Plan and all subsequent amendments will become part of the City’s Comprehensive Plan (adopted by reference), in accordance with Minnesota Rule 8410, Minnesota Statutes 103B.235, Subd. 3A and 473.859, Subd. 2 (Chapter 176, Laws of Minnesota 1995), as part of the adoption process for this Plan.

This Plan does not have to be re-submitted as a formal comprehensive plan amendment, subject to additional review, at a later date. The adopted City Plan and associated Rules will satisfy Metropolitan Council’s requirements and will be thereby recognized as an amendment to the City’s Comprehensive Plan.

C. Neighboring Jurisdictions and Water Resource Related Agreement

The City’s location at the top of the watershed means that all of its runoff in the watershed drains to other jurisdictions within the watershed. The City’s Zoning Ordinance contains provisions for the evaluation of downstream impacts from development to prevent downstream damage. These provisions apply to all developments whether they drain to Scott WMO, VRWJPO, or other watersheds unless superseded by separate, more stringent agreements.

One agreement is in place with New Market Township at this time. As part of the 2005 School Core Street and Utility Improvements an agreement between the City of New Market and New Market Township was reached to limit surface water discharge from the associated drainage area in Section 20 to limited pre-settlement rates. Future development in this subwatershed will limit discharge on a per acre basis. Developers will be encouraged to use low impact development, infiltration practices and Best Management Practices to meet the requirements. A copy of the agreement letter is located in Appendix B.

III. LAND AND WATER RESOURCE INVENTORY

The City of Elko New Market is located in the southeast corner of Scott County and is surrounded by New Market Township. The total hydrologic study area includes over 5,220 acres of watershed and is shown in Figure No. 1. As can be seen from the figure, the study area lies both within and outside of the current City limits. It has been assumed that growth around Elko New Market will continue to expand in all directions outward of the current City limits.

Elko New Market is situated at the divide of four major watershed divides. To the northeast is the Vermillion River, to the northwest is Credit River, to the southwest is Sand Creek and to the southeast is the North Cannon watershed. The stormwater runoff begins in each of these upper-most basins as sheet and shallow concentrated flow. This flow follows existing contours and

ravines and develops into intermittent surface flows and creeks directed downstream where they eventually enter into the Minnesota and Mississippi Rivers. The Vermillion River watershed areas within the City are the headwaters for a branch of the Vermillion River that is a designated trout stream located downstream in Eureka Township, which is in Dakota County.

Land use with the study area, outside of the urban areas, consists chiefly of gently rolling agricultural crop land with interspersed wetlands.

A. Soils and Geology

For the most part, the majority of soils in the Elko New Market study area consist of loam and silty clay loam. Although there are random areas that have high sand content with high infiltration rates, a large percentage of the soils found are classified as SCS, type B and/or type D, which are known to have moderate to low infiltration capabilities.

The typical B type soil consists of Hayden loam, which occupy approximately one-third of the upland soils in Scott County. Hayden soils are light-colored and are well-drained. These soils have a moderate rate of infiltration in the range of 0.15-0.30 inches/hour. Type D soils have a high runoff potential due to very slow infiltration rates. These soils consist primarily of soils with high ground water tables, soils with a claypan or a clay layer at or near the surface, and shallow soils over nearly impervious parent material. These soils have a very low rate of infiltration in range of 0-0.05 inches/hour. The watershed soil classifications are shown in Figure No. 3.

The dominant land form in Elko New Market is “dead ice moraine”, which refers to the remnants of the last of the glacier as it retreated. As the last ice melted it released huge piles of accumulated debris in a random pattern. The net result was the creation of a vast number of both connected and isolated wetlands with few organized stream patterns, except for the Vermillion River and Credit River corridors. The preservation and any potential enhancement of the Vermillion River and the enhancement of Credit River are key components of the City’s Storm Water Pollution Prevention Plan.

B. Temperature, Precipitation and Evaporation Summary

The typical Atlas 14 24-hour storm events to be used for future modeling in the Elko New Market area are shown in the table below:

Temperature, Precipitation and Evaporation Summary				
	1 Year	2 Year	10 Year	100 Year
Rainfall	2.47	2.8	4.2	7.29

The total average annual precipitation in this area is approximately 31 inches. The average annual snowfall is about 22 inches, which is roughly equivalent to 2.2 inches of water. It is interesting to note that the average annual pan evaporation amount is almost 37 inches for the months from April to October, which does not include evaporation that may occur during the winter months.

Average Monthly Temperature, Precipitation and Snowfall			
Station: Jordan 1 S, MN4176 (For the months from 1981 – 2010)			
Month	Avg. Temperature (°F)	Avg. Precipitation (inch)	Avg. Snowfall (inch)
January	13.0	0.73	6.6
February	18.4	0.62	3.3
March	30.6	1.73	2.4
April	45.5	2.53	1.4
May	57.3	3.69	0.0
June	66.7	4.64	0.0
July	70.7	3.49	0.0
August	68.0	5.05	0.0
September	59.6	3.41	0.0
October	47.1	2.47	0.1
November	31.9	1.64	2.0
December	17.2	0.95	6.3
Average =	43.8	2.58	
Total =		30.95	22.0

Pan evaporation is used to estimate the evaporation from lakes. An evaporation pan is used to hold water during observations for the determination of the quantity of evaporation at a given location. The table below shows the average pan evaporation at the University of Minnesota St. Paul campus.

Monthly PAN Evaporation (inches)								
1972 – 2014 PAN EVAPORATION DATA: St. Paul Climatological Observatory 21-8450-6								
	April	May	June	July	Aug.	Sept.	Oct.	Total
Avg.	1.85	6.72	7.50	8.06	6.67	4.75	1.26	36.83

The Scott WMO CWRMP – Section 1: Land and Water Resource Inventory contains the most current and comprehensive resource inventory for the Scott WMO portion of the watershed. Please reference Section 1, page 5, of the Scott WMO CWRMP for further information: (<http://www.scottcountymn.gov/DocumentCenter/Home/View/4801>)

The VRWMP – Section 1: Existing and Future Physical Environment, and Section 2: Existing and Future Biological Environment, provide existing and historical information regarding land and water resource information for the Vermillion River portion of the watershed. Please reference Sections 1 and 2 of the VRWMP for further information:

(<http://www.vermillionriverwatershed.org/plans-reports/watershed-management-plan/>)

IV. ESTABLISHMENT OF GOALS AND POLICIES

The primary goal of the City’s Plan and associated Rules is to provide the framework for the

management of all forms of surface water as development occurs both within and adjacent to the City in the area defined as the City's ultimate growth boundary. This Plan provides clear guidance on how the City will manage surface water both in terms of quantity and quality. The goals and policies stated in this Plan are complimentary to the goals and policies stated in the Scott WMO CWRMP and VRWMP.

An interceptor sewer line was constructed in 2005 along CSAH 2 to the City's eastern boundary. In 2011 this was connected to the Empire Waste Water Treatment Plant, which replaced the City's old waste water treatment plant. It is anticipated that growth in the Elko New Market community will begin to occur at a more rapid pace. Population growth, resource education, and increasing regulation of surface water at the State, County, and Federal levels necessitate that the City's surface water management goals evolve over time with increased awareness.

The goals and policies detailed in this Plan focus on future development as much as the existing infrastructure. The City only conducts plan reviews "as development occurs" as part of the preliminary plat submittal and approval process. This emphasis on future requirements ensures that future development augments the City's amenities rather than diminishes the complex environments that the City is located within.

A. Goal 1: Water Quantity

(See City ordinances for implementation of these polices)

The purpose of this goal is to control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of surface water runoff, in accordance with the Scott WMO CWRMP and the VRWMP. Traditional surface water management deals with just one component of the hydrologic cycle; surface runoff. Large amounts of energy are directed towards alleviating significant negative impacts of surface runoff and flooding for the cultural, water, and natural resources.

The primary management strategy is shifting from detention in both existing natural and constructed basins, to Low Impact Development (LID) techniques and Integrated Management Practices (IMPs) that emphasize reduction of runoff volume and on-site runoff control via infiltration or small volume storage to mimic predevelopment hydrology for more frequent rainfall events. This trend will help remedy the negative impact of stormwater runoff on water quality and downstream flooding. With increased value placed on natural wetlands, the number and extent to which wetlands can be used for detention is already in decline. The approach to sound water quantity management relates directly to water quality, wetland management, erosion control, and land development strategies. By comprehensively managing the quantity and quality of surface water runoff, the other goals of this Plan are more efficiently achieved.

Subject: Surface Water Runoff (Rate and Volume) Management.

Purpose: Control post-development stormwater runoff.

Goal: Control flooding, protect human life, protect public and private property, mimic existing runoff conditions, minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of surface water runoff from entering rivers, streams and wetlands in the watershed, and maintain or improve the downstream conveyance system.

Surface Water Quantity Policies

Policy 1.1: Utilize LID site design and alternative landscape techniques where applicable, along with conventional constructed on-site detention ponds for large, infrequent rainfall events. Pre-developed peak flow rates for the 1-yr, 2-yr, 10-yr, and 100-yr, 24-hour, storm

events cannot be exceeded by new development. These design techniques will be relied upon to help mimic pre-development hydrology and to control downstream flooding.

Unincorporated areas/development that are annexed into the City within the Scott WMO that have storm water facilities designed to the unincorporated standard of pre-settlement rates must retain that design rate.

The NOAA Atlas 14 rainfall depths using a NRCS MSE 3 or nested distribution shall be used for calculating peak flow rates. The main reasons behind this are that the City is located at the top of several watersheds, this type of distribution is familiar to design engineers in Minnesota, and the most conservative peak runoff rates typically result with the use of this distribution in the Elko New Market watershed environment.

Policy 1.2: The City encourages the use of regional detention ponds rather than localized on-site ponding when it works effectively into the planning and design of proposed improvements. The City recognizes that regional ponding works best when incorporated into active developments and will not in general initiate the construction of regional ponds independently.

Policy 1.3: Development that creates more than one acre of new impervious surface must incorporate volume control practices into the design sufficient to control the most restrictive of either the runoff volume from the 2-year 24-hour rainfall event to pre-development conditions, or one inch (1”) of runoff from new impervious surfaces. This requirement may be met on a regional or site by site basis.

Policy 1.4: Credits for various site design techniques will be allowed to help meet the volume control requirements and are the preferred approach for meeting volume controls.

Policy 1.5: Where LID techniques and localized ponding are not feasible, the City may consider cash in lieu of on-site ponding if downstream regional ponding facilities are feasible.

Policy 1.6: Emergency overflows or outlets for drainage systems are required and shall be provided to prevent flood damages and overtopping of constructed basins. These shall not be placed below the seasonally high water table unless it can be demonstrated that there is a reasonable need for such an outlet to control seepage damage to existing structures.

Policy 1.7: The minimum building elevation shall be set/designed to prevent flood damage from the established 100-year, 24-hour, storm event in accordance with established City Ordinances and the standards of this Plan, and associated Rules.

Policy 1.8: The City rewards the use of alternative landscape techniques and materials to reduce rates and volumes of stormwater runoff.

Policy 1.9: The City shall require stormwater ponds, wetlands, flood plains, and ditches to be located in outlots as part of the land development approval process.

Policy 1.10: Outlets from landlocked basins will be allowed, provided such outlets are consistent with State and federal regulations, and the downstream impacts, riparian impacts, and habitat impacts of such outlets have been analyzed and no detrimental impacts result.

Policy 1.11: The City shall maintain and periodically inspect stormwater management facilities and structures to assure they function as originally designed according to the Storm Water Pollution Prevention Plan requirements.

Policy 1.12: For development that occurs near the outer limits of the City’s 2040 growth boundary, adjacent to the townships, the City will work closely with the County and the

townships to ensure that downstream conveyance systems are not impacted by upstream development.

The City of Elko New Market Environmental Protection Ordinance addresses the current water quantity requirements. When this Plan is adopted the Ordinance will be revised to incorporate by reference this Plan that reflects the new goals, policies and forthcoming Rules.

B. Goal 2: Water Quality

The purpose of this goal is to achieve water quality standards in lakes, creeks, and wetlands consistent with the intended use and classification, in accordance with the Scott WMO CWRMP and the VRWMP. Water quality is often directly related to the level of nutrients in the water body. While nutrients comprise only one category of substances that can affect water quality, nutrients, principally phosphorous, must be controlled to achieve the water quality goals of this Plan. Phosphorous is generally the limiting factor to plant growth. An increase in phosphorous will cause the plant species dominating the lakeshore, open water, or marsh to shift in favor those plants that can best take advantage of the increased supply of the nutrient.

Controlling nutrients through housekeeping practices are a way for City residents to make a difference. According to the Minneapolis Chain of Lakes Clean Water Partnership, many people do not realize that organic materials like leaves, grass clippings, fertilizers, pesticides, and pet waste can disrupt the fragile ecosystem of a lake or creek.

Leaves and grass clippings that make their way into lakes and creeks are doing more damage than fertilizers, pesticides, or motor oils, according to the Minneapolis Chain of Lakes Clean Water Partnership. Once in the lakes and creeks, these organic materials decay, and subsequently release nutrients. The excess nutrients increase algae growth, which inhibits the growth of other aquatic plants and animals. When algae die and decay, they exert a biological oxygen demand on the lake, depleting available oxygen for fish. Algae growth due to nutrient loading can damage or even kill a lake's ecosystem.

Fertilizer application may be necessary for a healthy lawn, but the nutrients in fertilizer can be harmful to lakes, creeks, and wetlands. Nutrients from fertilizers run off lawns and ultimately discharge to area lakes, creeks, and wetlands. Effective January 1, 2005, in Minnesota, fertilizers containing phosphorous cannot be used on lawns. Refer to the Minnesota Department of Agriculture (www.mda.state.mn.us/appd/ace/phoslaw.htm) website for additional information. Applying the proper fertilizer, in the right amount, ensures a healthier lawn and healthier lakes, creeks, and wetlands.

Total Maximum Daily Load (TMDL) represents the maximum amount of a pollutant that a water body can receive and still meet federal and state water quality standards. TMDL also refers to the process of allocating pollutant loadings among point and non-point sources.

That portion of the Vermillion River within the 2040 growth boundary, from the headwaters to the east, was added to the 2012 draft list of impaired waters. It was listed for impairment due to fecal coliform. The TMDL study was completed in 2015. The fecal coliform is considered a non-construction related impairment and does not require best management practices for compliance with the construction permit.

Porter Creek has been listed as a state impaired stream for turbidity from Fairbanks Avenue to 250th Street East. It was added to the impaired list in 2010. On the draft 2020 Impaired Waters List the target date for completion of the TMDL is 2028. The City looks forward to working with the MPCA and Scott County in the study planning process.

The VRWJPO Standards have criteria for temperature control of discharge from areas that

do not first drain to a waterbody of 10 or more acres of open water. The western one-third of the Vermillion River Watershed in the City drains through Rice Lake, a lake approximately 40 acres in size, prior to flowing into a reach of the Upper Vermillion River. The easterly two-thirds portion of the Vermillion River Watershed in the City's growth area drains to the east, on the south side of Rice Lake, where it then joins together with the outlet channel from Rice Lake. The distance from the easterly portion of the Vermillion River Watershed to the designated trout stream portion of the river is approximately 16,500-ft (~3 miles). In a report prepared by Emmons & Olivier Resources, titled "Vermillion River Headwaters Groundwater Area Inventory and Protection Plan", this 3mile stretch of river was classified as a losing reach. This means that the river was losing water to the adjacent soils and groundwater.

With the westerly portion of the City's Vermillion River Watershed draining through Rice Lake and the interaction of runoff from the easterly portion through a "losing reach", temperature control of runoff from the Vermillion River Watershed in the City would have little, if any, effect on the downstream temperature of the trout stream. Given this, the City will establish policies that promote cooling of runoff, but does not intend to establish limits or required BMP's.

Subject: Water quality in lakes, rivers, creeks, and wetlands.

Purpose: To protect and enhance water quality.

Goal: Achieve water quality standards in lakes, rivers, creeks, and wetlands consistent with their intended use and established classification.

Water Quality Policies (see City ordinances for implementation of these policies)

Policy 2.1: Development that disturbs more than one acre, or creates more than one acre of impervious surface, shall demonstrate that phosphorus and Total Suspended Solids (TSS) reduction in discharge runoff meets NURP levels described in this Plan and accompanying Rules.

Policy 2.2: Public road and utility projects that disturb greater than one acre must include temporary BMPs to control water quality; if more than one acre of additional impervious surface is created, the project shall include permanent water quality BMPs to meet the requirements of the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit, this Plan, and accompanying Rules.

Policy 2.3: The rebuilding, repair, or alteration of a structure, land surface, road or street, or facility that creates less than 1 acre of new impervious surface, and disturbs, replaces, or alters more than 1 acre of existing impervious surface shall incorporate water quality BMPs to the extent practical.

Policy 2.4: Proposed developments must identify all reasonable steps taken to avoid water quality impacts. They must also mitigate unavoidable impacts with appropriate BMPs to prevent water quality in receiving waters from falling below established standards including TMDLs, and to meet City erosion control Ordinance standards.

Policy 2.5: The City shall supplement its regulatory approach with an education-based approach to achieve appropriate yard care measures. This will reduce nutrient loading to City lakes, creeks, and wetlands, and will reduce the impacts of domestic animal waste.

Policy 2.6: The City shall promote the reduction or minimization of hard surfaced areas, where applicable.

Policy 2.7: The City will balance protection of natural wetlands and utilization of

constructed wetlands to protect the water quality of other water resources (i.e., wetlands, lakes, creeks) based on Mn/RAM 3.4 wetland classification.

Policy 2.8: The City encourages and rewards the use of alternative landscape techniques and materials and LID IMPs to reduce and mitigate water quality impacts.

Policy 2.9: The City will manage public properties in accordance with the appropriate BMPs.

Policy 2.10: It essential that the condition of water bodies in the Watershed included on the MPCA impaired waters [303(d)] list be improved so that these waterbodies can be removed from the 303d list.

Policy 2.11: Use of existing natural retention and detention areas for stormwater management to maintain or improve existing water quality will be achieved to the extent possible.

Policy 2.12: The City supports land use planning, policies and controls that maintain sustainable, high-quality surface water resources and ensure that development causes no adverse or cumulative impacts.

Policy 2.13: Require buffers adjacent to major waterways tributary to the Vermillion River. See Figure No. 8 for the waterway corridors to be protected and the required buffer widths. The buffers shall be protected as outlots or with conservation easements.

The City of Elko New Market Environmental Protection Ordinance addresses the current water quality requirements. When this Plan is adopted the Ordinance will be revised to incorporate by reference this Plan that reflects the new goals, policies and accompanying Rules.

C. Goal 3: Erosion Control

The purpose of this goal is to minimize soil erosion through increased education and enforcement, in accordance with the Scott WMO CWRMP and VRWMP. Water quality problems are frequently linked to high phosphorus concentrations. Phosphorus is often transported to surface water through soil erosion but can also be transported to waters in a variety of other mechanisms. Nevertheless, erosion control is an important factor in the effort to improve surface water quality. Soil erosion and sediment deposition can also impact pond and drainage-way performance and create maintenance issues.

Ponds and drainage facilities may be impacted by erosion and sedimentation from a variety of sources including construction sites and winter street sanding. The coarse sediment accumulates in ditches and ponds where runoff velocities are low. When a sand delta appears at a storm sewer outfall that is a visible indication of the effectiveness of erosion and sediment control measures and road maintenance activities of the past winter. As the sediment builds up over time, it reduces the capacity of the drainage system and the pollutant removal capabilities of ponds by reducing storage volume below the outlet. This also reduces the infiltration rates for stormwater facilities. Extending the life of facilities involves source control and elimination of the material that causes the problem. Regulatory actions will control a major portion of the sediment. Street maintenance and an effective sweeping program will also have a positive impact.

Subject: Erosion control.

Purpose: To control erosion and sedimentation.

Goal: Minimize soil erosion through increased education, enforcement and management of stormwater.

Erosion Control Policies

Policy 3.1: Erosion and Sedimentation Control Plans shall be reviewed and enforced by the City for all grading activities. These plans shall conform to the general criteria set forth by the City’s Environmental Protection Ordinance and applicable NPDES /SDS Permit (MPCA Permit MN R100001) requirements.

Policy 3.2: The City will implement an erosion control Ordinance to control erosion and sediment to extend the effective life of water resource facilities and reduce pollutant loading to streams, lakes, and wetlands.

Policy 3.3: The City will develop proactive measures such as education, incentives, and recognition of erosion control efforts to prevent soil erosion and encourage responsible site development.

Policy 3.4: Construction site inspection by the City must be completed prior to commencing earthwork activities to ensure the proper BMPs are in place and operational.

Policy 3.5: Horizontal, vegetative buffer zones between twenty -five and fifty feet are required around existing wetlands based on the MnRAM rating, the VRWJPO buffer requirements, and the NPDES/SDS Permit. Stormwater ponds shall have a minimum 25-foot building setback from buffers. New development or redevelopment projects must provide the appropriate buffer zone around new and existing wetlands and are required to provide 25-foot buffers around existing and new stormwater ponds. Buffers shall be maintained in native vegetation to provide habitat for wildlife. These buffer widths will be required by ordinance and protected by outlots or conservation easements.

Policy 3.6: The City will maximize the use of bioengineering approaches whenever possible for all slope stabilization and permanent erosion control projects.

Policy 3.7: If a construction activity creates more than 1 acre of disturbed area and the activity takes place where the soils are currently disturbed, areas that will not be graded as part of the development and areas that will not be stabilized according to the NPDES/SDS Permit, shall be seeded with a temporary or permanent cover before commencing the proposed land disturbing activity.

The City of Elko New Market Environmental Protection Ordinance addresses the current erosion control requirements. When this Plan is adopted the Ordinance will be revised to incorporate by reference this Plan that reflects the new goals, policies and accompanying Rules.

D. Goal 4: Wetlands

The purpose of this goal is to maintain or increase the amount of wetland acreage, and increase the wetland functions and values within the City, in accordance with the Scott WMO CWRMP and the VRWMP. The City is the LGU for the Wetland Conservation Act (WCA). The City has not completed a Comprehensive Wetland Management Plan. The wetland inventory is based on the wetlands in the National Wetland Inventory (NWI) and Scott County’s records, which may not include all of the wetlands and aquatic resources in the City. The City does not have the resources to survey all of the wetlands at this time. Field delineation, assessment of hydrology, identification of plant species, characterizations of soils, MnRAM assessment and restoration are generally completed and reviewed on an “as development occurs” basis. This approach places the financial burden for identification, delineation, and possible restoration on the land developer.

The policies below will be used to achieve the City’s wetland goals. The strategies will apply to new development and redevelopment projects submitted to the City for review and

approval. Any wetland habitat on property to be developed will be subject to the following management strategies, as well as the rules and requirements of the WCA and other City, State, and Federal regulations.

Proper implementation of stream, bluff, and wetland buffers in new developments is paramount. Without proper implementation of buffers; stream and wetland water temperatures increase, sediment deposition increases, stream and bluff bank erosion and collapse are more severe, and riparian habitats are destroyed.

Subject: Wetland Management

Purpose: To utilize, protect, preserve, and enhance existing natural wetlands.

Goal: Maintain or increase the amount of wetland acreage, and increase the wetland functions and values within the City.

Wetland Policies

Policy 4.1: The City shall administer wetland protection and mitigation as the LGU for the WCA in accordance with the Minnesota WCA, Scott WMO CWRMP and the VRWMP.

Policy 4.2: A vegetative function and value assessment using the most current version of MnRAM shall be completed for each wetland delineated.

Policy 4.3: The City will require the establishment of vegetative buffers around wetlands in accordance with its MnRAM ranking and regulatory requirements. Development or redevelopment of an area adjacent to a wetland will require the establishment of the appropriate buffer. The buffer areas will be protected by outlots or conservation easements.

Policy 4.4: The artificial water level fluctuation (bounce) in wetlands resulting from stormwater runoff will be managed in accordance with the WCA, Scott WMO CRWMP and the VRWMP. Outflow rates and elevations must be controlled to avoid water elevations that may permanently affect the character of the resource per “Recommended hydroperiod standards for wetlands” table in the State of Minnesota Stormwater Manual (see Appendix C).

Policy 4.5: The City may utilize the available technical resources of outside agencies, such as the Minnesota DNR, USACE, Scott SWCD, the Board of Water and Soil Resources and/or the Scott WMO and VRWJPO, for review of private developments and City-proposed projects that may affect wetland resources.

Policy 4.6: Developers must provide a field delineation in accordance with applicable rules and regulations to determine the jurisdictional boundaries of wetlands, including a report of the results of the field delineation, detailing the methodology and findings of the delineation. A printed and electronic copy (.dwg) of the approved delineation boundary will be required to be submitted to the City.

Policy 4.7: Prior to any site development activities, the City will verify through a wetland boundary delineation review, the location and extent of all wetlands present. The results of the wetland boundary delineation will be compared to the field delineation data provided by the developer.

Policy 4.8: Any review of a proposed wetland encroachment must first address the issue of avoidance and project alternatives. Prior to allowing any wetland encroachment, all reasonable attempts to avoid such alteration must be demonstrated. This avoidance must also consider the reasonableness of the no-build alternative.

Policy 4.9: Replacement for unavoidable wetland impacts will be provided (if possible, within the same subwatershed), in accordance with the requirements of the Scott WMO CWRMP, the VRWMP and the WCA.

Policy 4.10: The City will not allow excavation, or other non-filling related alterations to an existing wetland without the expressed written approval of the City Administrator or designee.

Policy 4.11: The City shall require pretreatment of stormwater runoff discharged directly into wetlands, except possibly for wetlands with a low quality MnRam rating. Treatment will be required to meet or exceed N.U.R.P. efficiencies for removal of TSS and total phosphorous prior to discharge.

Policy 4.12: The City will encourage wetland restoration as well as wetland protection strategies in proposed development and redevelopment projects. Public Value Credits (PVCs) may be provided for improvement of existing wetland habitat associated with development and/or wetland replacement projects, in accordance with established WCA rules.

Policy 4.13: Fragmentation and impacts to natural areas and corridors will be avoided when feasible or mitigated when unavoidable at equal value. High priority natural areas identified through the land cover mapping done for the Scott Biological Survey and other inventories will be the tools used to evaluate development proposals and set preservation goals to protect high-quality habitat for plants and animals.

The City of Elko New Market Environmental Protection Ordinance addresses the current wetland requirements. When this Plan is adopted the Ordinance will be revised to incorporate by reference this Plan that reflects the new goals, policies and accompanying Rules.

E. Goal 5: Public Participation, Information & Education

The purpose of this goal is to increase public participation and knowledge in management of the City's water resources, in accordance with the Scott WMO CWRMP and the VRWMP. Public involvement is a strategy that recognizes people want to be involved in decisions that affect any facet of their life. It provides opportunities for the public to participate in the processes that lead to decision-making.

As part of the NPDES/SDS Phase II requirements the City was required to prepare a Surface Water Pollution Prevention Plan (SWPPP). There are two minimum control measures in the SWPPP that deal with public education and participation. Measure number one is: Public Education and Outreach on Storm Water Impacts. Measure number two is: Public Participation and Involvement. To meet the permit requirements the City must educate its citizens on six minimum control measures in the SWPPP. The City must also hold at least one public meeting per year to address an annual report regarding the SWPPP to receive public input. The activities described in the SWPPP will be the guiding document that will be followed to increase public awareness of the storm water related issues.

Website Availability - <http://www.ci.enm.mn.us/>. The website is an alternative medium to provide municipal information to both City residents and those people who live outside Elko New Market. An electronic version of this Plan will ultimately be accessible on the website. Because the Plan has such a wide audience from engineers, planners, developers, citizens, scientists, and educators electronic access to the text and mapping creates a better understanding of the goals, policies, and activities of this Plan.

The City will continue to distribute information on pertinent water and wetland

management issues via the City of Elko New Market Monthly Newsletter. The newsletter will promote opportunities for residents to participate in water resources management activities. The City will make an ongoing effort on both a City-wide and watershed level toward educating the public by distributing information to its residents on responsible practices they should employ to protect water resources within the community. The program will also educate residents on the benefits of using phosphorus-free fertilizer.

Subject: Enhancement of Public Participation, Information and Education

Purpose: Encourage active community involvement in water resources management.

Goal: Increase public participation and knowledge in management of the water resources of the community.

Public Involvement Policies

Policy 5.1: The City will use a public involvement process in resource management decision-making (i.e., the Parks Commission, and the Planning Commission).

Policy 5.2: The City will use a variety of media, including newsletters, and the City's Website, to inform the community about water resource issue programs including alternative landscapes, phosphorus free fertilizer, aquatic plant management, etc. The City will make an ongoing effort on both a local and municipal level to distribute information to residents on responsible practices to protect water resources in the City. Educational information will also be provided regarding the proper use of a wide range of lawn chemicals and proper disposal of hazardous household materials.

Policy 5.3: The City will work with all available resources to increase public participation in water resources management.

Policy 5.4: The City will follow the best management practices outlined in the City's Storm Water Pollution Prevention Plan (SWPPP) that address public education and outreach and public participation/involvement. Educational goals and activities have been identified in the SWPPP to make the public more informed of the impact storm water discharges and pollutants have on receiving waters.

F. Goal 6: Groundwater Management

The City's groundwater resources are identified in the city of Elko New Market Wellhead Protection Plan. The City's aquifers have been assigned a "Not Vulnerable" rating. This rating indicates "there is not a hydraulic connection between surface waters and the aquifer serving the water supply system for the City".

The City of Elko New Market Wellhead Protection Plan currently outlines requirements for continued groundwater protection and well management. The report is obtainable directly from the City's Website.

Subject: Groundwater Management

Purpose: To protect groundwater quality and improve groundwater supplies through effective management.

Goal: Provide clean and safe drinking water for the City while managing increased development and population.

Groundwater Management Policies

Policy 6.1: Promote ongoing evaluation of land use impacts on groundwater quality and quantity.

Policy 6.2: Provide information to the public by revising and updating the City Wellhead Protection Plan as required by the Minnesota Department of Health.

Policy 6.3: Support identification and reduction of groundwater contamination from both point and non-point sources.

Policy 6.4: Promote water conservation efforts to reduce water use and conserve the City's groundwater resources.

Policy 6.5: Groundwater quality should not be sacrificed to manage surface water. Holding ponds, animal watering ponds, wetlands and other water storage areas must be designed to protect groundwater.

Policy 6.6: Infiltration of stormwater and resulting groundwater recharge will be promoted where it is feasible and does not pose a threat to groundwater quality.

G. Goal 7: Floodplain Management

There are multiple areas shown on the Flood Insurance Rate Map (FIRM) for the City of Elko New Market and the growth area that are identified as Zone A floodplains in the 2040 study area (see Figure No. 6). No base flood elevations have been determined for these floodplains. The City's ordinance will regulate development adjacent to the floodplain districts.

Moderate flood hazard areas, labeled Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood (100-year) and the 0.2-percent-annual-chance (or 500-year) flood. Unshaded Zone X areas are those areas determined to be outside the 100-year and 500-year floodplains.

These areas have been identified on the FIRM as areas of moderate or minimal hazard from the principal source of flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems.

FEMA and Scott County are currently updating the FIRM's for the Vermillion River with new panels expected to be published in the near future.

Subject: Floodplain Management

Purpose: To provide flood protection for people and property.

Goal: Manage and protect the floodplains from encroachment.

Floodplain Management Policies

Policy 7.1: Protect the natural function of a floodwater storage area in a floodplain from encroachment.

Policy 7.2: Work to maintain no net loss of floodplain storage.

Policy 7.3: Manage floodplains to maintain critical 100-year flood storage volumes.

Policy 7.4: Restrict construction of new structures to sites above flood prone areas.

Policy 7.5: Maximize upstream floodwater storage areas and require mitigation for any fill within a floodplain.

POND DESIGN AND CRITERIA

When possible, regional detention/water quality ponds will meet NURP or NPDES/SDS standards and City requirements. Wet settling basins are an accepted and proven BMP technique widely accepted for stormwater quality treatment prior to discharge. All regional

and localized detention/water quality pond design parameters will need to be carefully considered to ensure that there is no impact to existing downstream properties. It is imperative not to increase the groundwater gradient and the potential for basement seepage associated with regional or localized detention/water quality ponds.

Every attempt has been made to strategically locate regional and localized detention/water quality ponds in existing closed depressions within a given watershed or subwatershed. Steps have been taken to avoid wetlands and DNR waters. The intent is to minimize the excavation required and to optimize the volume and size of storm sewer conveyance piping associated with pond construction.

The proposed conveyance network utilizes the natural drainage routes wherever feasible. Open space adjacent to ponds and drainage routes may be used beneficially for vegetative buffer, trails, parks, conservation areas, and wildlife habitat.

The proposed detention/water quality ponds may be designed as non-uniform meandering waterways, creating a more natural appearance while maintaining the design intent and providing cost savings by reducing the length of large diameter pipe.

The VRWJPO set flow limits, via numeric standards, at two northern City limit locations that must not be exceeded. The first location is approximately 250 feet east of Dakota Avenue with a flow limit of 232 cfs. The second location is approximately 1,300 feet east of Xerxes Avenue with a flow limit of 26 cfs. The hydrologic model will need to be analyzed and ran to determine how these set flowrates will be affected as future development occurs in the catchments upstream of these outflow locations.

The City has an agreement with New Market Township regarding the flow rates from Section 20 that discharges through a culvert under 250th Street, approximately 2,750 feet east of Texas Avenue. Details of the agreement are in a memo, located in Appendix B.

When reviewing development plans the SCS runoff curve number (CN) for the existing agricultural areas and the minimum CN's for developed conditions should be limited to the values in the following table:

Land Use Curve Number	
Maximum existing (excludes wetlands)	70
Minimum residential development	72
Minimum commercial development	90
Minimum industrial development	90

These values are general in nature and typically apply to the urban development of existing farmland. We anticipate instances in which the existing land use is either pasture, wetland, or ungrazed meadows, etc., which will require appropriate curve number adjustment in accordance with standard SCS TR-20 and TR-55 methodology. The City Engineer may allow exceptions to the table above based on land cover and soil types when adequate data is provided for review.

V. ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTIONS

There are no lakes, as defined by the DNR, or navigable waters within the City's growth boundary. There are several ditches that are the headwaters of creeks and rivers, which are part of three different watersheds. Given the lack of aquatic resources most of the water resource related issues the City faces will deal with development and the problems associated with it. Given this, the City will concentrate on effective implementation of their Storm Water Pollution Prevention Plan (SWPPP), which addresses all aspects in the protection of water resources.

The assessment of problems in the Plan includes reviewing possible adverse effects of surface water that have been identified by local, state and federal agencies, in research, literature, and other stormwater management materials. The assessments were divided into three potential sources of problems (Source Areas).

A. Public Lands Managed by Public Agencies

The first potential Source Area addresses public lands or areas that are managed by public agencies (i.e., public streets, parking lots, sewer lines, parks, public facilities, etc.). The identified potential problems in this source area include but are not limited to:

1. The need to maintain high quality recreational use of the City's water resources, whether it is for fishing, waterfowl habitat, etc. The MPCA first listed the Vermillion River as state impaired water in the 2008 TMDL List of Impaired Waters and the TMDL for E. coli was completed in 2015. Porter Creek was first listed by the MCA as impaired for turbidity in 2010. In the draft 2020 Impaired Waters List the Porter Creek TMDL is scheduled to be completed in 2028.
2. The need for community education programs regarding sustainable water resource management.
3. The need for an adequate road salt management program.
4. The importance of maintaining the City's surface water management system and overall goals while encouraging private development.
5. The need for and frequency of sweeping of public and private streets and parking lots. The City currently sweeps all City streets and parking lots in the spring and fall.
6. The need to establish local spill containment plans. A portion of the downtown drains by storm sewer directly to Whispering Creek. This area is exposed to filling station tank refueling activity.
7. The need for other management programs as considered necessary. The City is beginning to receive inquiries from residents regarding "beautification" projects for stormwater ponds. Establishment of policies limiting modifications to those that do not impact their function may be beneficial in promoting water quality.

B. Privately Owned Lands

The second potential Source Area addresses existing development on privately owned lands (i.e., private homes, small businesses, large commercial areas, industrial areas, private parking lots, and private streets, etc.). The identified potential problems in this source area include but are not limited to:

1. Soil erosion from site disturbances (construction) on private lands.
2. Private lawn and garden maintenance (phosphorous and nitrogen loading).
3. Landscaping of stream banks on private land.
4. Litter accumulation on private lands.
5. Wetland buffer degradation on private lands.

6. Stream bank erosion and collapse on private lands.
7. Private vehicle and equipment storage sites.
8. Snow and ice removal methods from private parking lots and streets.
9. Impervious surface management (private streets and parking lots).
10. Illicit discharge to storm sewers.

C. New Residential, Commercial, and Industrial Development

The third potential source area focuses on new residential, commercial, and industrial development. Possible surface water problems in this section are directly associated with the construction process and how new developments may impact local natural resources and public infrastructure both during construction and after they are completed.

A major source of concern for the City is the projected development rate and associated stormwater volume and rate increases. In addition, problems caused by development in environmentally sensitive areas are also a concern (i.e., buffers, streams and wetlands). The identified potential problems in this Source Area include but are not limited to:

1. Concern about contamination of Credit River, Vermillion River and public conveyance networks with sediment from construction sites and improper use of BMPs in new developments (e.g., detention basins, grass swales, etc.).
2. Proper implementation of creek, bluff, and wetland buffers in new developments. Without proper implementation of buffers, sediment deposition increases, creek bank erosion and collapse are more severe, and riparian habitats are destroyed. See Appendix A, for the applicable area maps. As part of the development permitting process the City will determine, based on accurate topographical maps, whether development will be permitted in any particular bluff, creek, or wetland area.

The Environmental Protection Agency developed a program called the General Permit To Discharge Stormwater Associated With Small Municipal Separate Storm Sewer Systems (MS4) Under The National Pollution Discharge Elimination System (NPDES/SDS). The City is a mandatory MS4 community. Under Phase II of this program, small MS4s were required to get a permit for their storm water management system. As a condition of the permit the City was required to prepare a SWPPP. The SWPPP identifies structural and non-structural controls that will be put into place to minimize negative impacts caused by storm water discharges to the environment. Best management practices (BMPs) have been identified and are used to meet the six minimum control measures requirements of the NPDES/SDS Phase II Permit.

Programmatic improvements and implementations will be required to manage the water resources within the City more effectively. For the area within the City’s defined growth boundary area where there is a planned increase in development and stormwater runoff systems are planned, corrective actions may include but are not be limited to:

1. Implement City programs to target developer and resident education efforts. The programs will outline what residents and developments can do to improve the efficiency of nitrogen and phosphorus reduction from existing and proposed surface water runoff.
2. Review of proposed development submittals to verify the requirements stated in the City Comprehensive Surface Water Management Plan Rules and existing City Ordinances have been met prior to approval. This will ensure that the approved BMPs have been selected and the City is engaged in a pattern of sustainable growth.

Many of the following issues and corrective actions have been identified in the City’s

SWPPP and associated BMP summary sheets.

D. Issues and Corrective Actions

Issue	Corrective Action
Illicit discharge detection and elimination	An illicit discharge ordinance prohibiting non-storm water discharges, including illegal dumping into the storm sewer system was adopted by the City
Public education regarding storm water related issues	An education program that involves distributing storm water related educational materials to the community was implemented by the City as part of its MS4 permit
Illicit discharge detection and elimination plan	An illicit discharge inspection and assessment program was adopted as part of the City's MS4 permit. Administrative procedures for notifying and enforcing non-compliance was included as part of the program
Construction site storm water runoff control	A construction site storm water runoff control ordinance to reduce pollutants in storm water runoff from construction activities was adopted by the City
Location of farm field drain tiles	The location of existing drain tiles will be required by developers when proposed development occurs. Drain tiles will need to be rerouted as necessary to maintain existing flows
Floodplain management ordinance	An ordinance to effectively address floodplain management was adopted by the City in 2014
Site inspection and enforcement procedures	Procedures, including an inspection checklist and time frames for conducting site inspections, were established as part of the City's MS4 permit
Financing of storm water projects, which include storm water facilities, water quality improvements and community education	Review storm water area charge and utility fee to insure that sufficient funds are being collected by the City
Pollution prevention and good housekeeping practices	<p>Annual inspection of all structural pollution control devices within the City. Use of the following BMPs related to salt and sanding for snow and ice control:</p> <ul style="list-style-type: none"> Use of additives such as "Clear Lane" to allow less salt and sand to be applied Use of remote distribution rate controls on each truck to facilitate instantaneous modification of application rates to match conditions Sweep entire City as early as possible each Spring Annual maintenance and calibration of distribution equipment Limit snow removal and associated ice control to snowfall events greater than two inches or locations where there is a present ice hazard for lesser events only
Ground water protection	A well head protection plan was prepared per the Minnesota Department of Health requirements
Increased runoff volumes due to new development	Promote a decrease in runoff volume through infiltration and other volume reduction best management practices through administrative policies and decisions
Compliance with future TMDL standards	Participate in the development of TMDL studies for water bodies affected by the City's watersheds as applicable

VI. IMPLEMENTATION PRIORITIES

The criteria, considerations, and constraints used to prioritize City surface water improvements and activities reflect the City's values, goals, and policies. Changes in any one of these factors can result in a change in project priority. The City's stormwater management program has evolved over time, and in view of recent challenges, the future will bring even more significant change. The breadth and extent of these changes, at present, are largely unknown.

The City's SWPPP identifies an implementation schedule for each of the six minimum control measures identified. The implementation priorities will closely follow those specified in the SWPPP. For management components that are not identified in the SWPPP they will be addressed largely through the rules that will enforce this plan.

Some factors that influence the City's stormwater management program do not lend themselves to a quantitative system of prioritization. For example, deciding the exact projects to include in each year's City improvement plan requires a high level of professional judgment based upon the best available knowledge and awareness of the local political climate toward cost-effective improvements. Many projects that are included in an annual improvement package most likely will have surface water components although the project focus is not surface water. Though difficult to quantify, these components and influences play an important part in deciding the inclusion of selected projects into the following improvement program.

The City of Elko New Market will continue to conduct private development project reviews on a "project-by-project" basis. Based on when specific property owners choose to develop the City will take that opportunity to implement the following priorities. The City will also implement the following components of possible CIP projects;

A. Surface Water Quantity Management

Prioritize City projects that provide storm water runoff quantity management. The purpose is to control post-development surface water runoff. The goal is to promote projects that control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of runoff.

B. Surface Water Quality Management

Prioritize projects that provide water quality improvements in lakes, creeks, and wetlands within the City. The purpose is to protect and improve water quality in the City's lakes, creeks and wetlands. The goal is to achieve water quality standards in lakes, creeks, and wetlands consistent with their intended use and established classification.

B. 1. Chloride Management

Estimates indicate that 80 percent of the environmental damage caused from de-icing chemicals is a result of inadequate storage of the material (MPCA 1989). Therefore, proper storage of salt is critical in reducing the amount of chloride that is transported to the environment. The following procedures can be used as a guideline for de-icing storage practices.

- Store de-icing material in waterproof sheds. If this is not possible, stockpiles shall be covered with polyethylene.
- Divert off-site runoff away from storage locations. Berms and shallow drainage swales may need to be constructed.
- Place stockpiles on impervious surfaces. Infiltration of runoff high in chloride content can pollute the ground water. Impervious surfaces also provide easier year-end cleanup of loading areas and will not become muddy during the spring.

- Contain runoff from stockpile locations. Runoff from stockpiles shall not be allowed to flow directly into streams or wetlands where environmental damage can occur.
- Road de-icing stockpiles shall not be located near municipal well areas or in other sensitive ground water areas.

Practices shall also be followed to reduce the amount of salt that is applied to roads. One method is to limit the amount of salt applied to low traffic areas and straight level areas. Streets shall be inspected for the need for de-icing prior to application. Equipment shall be maintained in good working order to evenly distribute salt on roadways and shall be properly calibrated to prevent excessive application. The City currently follows these practices.

C. Erosion Control Management

Prioritize projects that minimize the mobilization of sediment and enhance site erosion control requirements. The purpose is to control erosion and sedimentation on private developments and in public drainage systems. The goal is to minimize soil erosion through increased education and enforcement of existing BMP Ordinance.

D. Wetland Management

Prioritize projects that enhance the City’s wetland management. The purpose is to utilize, protect, preserve, and enhance existing natural wetlands. The goal is to maintain or increase the amount of wetland acreage, and increase the wetland functions and values within the City, in accordance with the Scott WMO CWRMP and VRWMP.

E. Public Participation and Education

Prioritize projects that enhance the current level of public participation, information, and education on City projects. The purpose is to encourage active community involvement in all aspects of surface water resources management. The goal is to increase public assistance, participation, and knowledge in management of the water resources of the community.

F. Groundwater Management

Prioritize projects that provide sound, long-term groundwater and aquifer management. The purpose is to protect groundwater quality and improve groundwater supplies through effective management. The goal is to provide clean and safe drinking water for the City while managing increased development and population.

VII. IMPLEMENTATION PROGRAM

The primary means the City will use to implement the standards of this Plan, the Scott WMO CWRMP and the VRWMP is through the adoption and implementation of the City of Elko New Market Plan, associated Rules, and Ordinances. Private development projects within the City are reviewed on a “project-by-project” basis and it is during this review the City has the opportunity to implement the goals, policies, and priorities developed in the Plan.

City improvement projects provide another opportunity for the City to implement the goals, policies, and priorities developed in this Plan. Most CIP projects generally have a surface water component. Development of a CIP will serve as a useful planning tool for City sponsored surface water projects.

There are also specific development-independent implementation goals that the City will continue to develop on a parallel administrative track to the general goals listed above. The City will finance these goals either directly or by specific development related review and construction

inspection budgets.

The following is an implementation process list of the recommended actions, timing, responsible party, and the cost or funding sources which are presented for the City Council's consideration based upon the data compiled in this report. Actions are listed in order of priority, from highest to lowest.

Action	Timing	Responsible Party	Funding Source
Maintain and implement Capital Improvement Program	On-going, updated on a 5 year period	City of Elko New Market	Storm water area charge, utility fee and project specific engineering budgets
Storm water maintenance program to ensure the successful operation of the drainage system.	On-going	City of Elko New Market	Storm water area charge, utility fee and annual engineering and maintenance budgets
Corrective actions for storm water problems be developed and implemented.	On-going, as problems are brought to the attention of Staff	City of Elko New Market	Storm water area charge, assessments and project specific engineering budgets
Enforcement of the erosion and sedimentation control ordinance for new developments.	On-going, as development projects are submitted to the City for approval	City of Elko New Market	Funding by developer's fees, building permits and fines collected for non-compliance
Encourage low impact development and better site design components for new development projects.	On-going, as development projects are submitted to the City for approval	City of Elko New Market	Funding by developer's fees and project specific engineering budgets
Established modeled ponding areas and maximum flow rates and volumes as referenced during initial phases of development projects.	On-going, as developments are submitted to the City for approval	City of Elko New Market	Funding by developer's fees and annual engineering budget
Review procedures to be established to ensure all construction projects within the City are in compliance with erosion control ordinance.	On-going	City of Elko New Market	Funding by developer's fees and annual engineering budget
Update the City detailed hydrologic analysis during final design of all ponding areas.	Currently in place. Update as necessary.	City of Elko New Market	Funding by developer's fees and project specific engineering budgets
High water elevations governing building finish floor elevations adjacent to ponding areas and floodplains to be established per this Plan, Rules, and Ordinance.	On-going, as development projects are submitted to the City for approval	City of Elko New Market	Funding by developer's fees and building permits.

Action	Timing	Responsible Party	Funding Source
Emergency overflow routes to be established and maintained to provide stabilized relief during extreme storm conditions, which exceed design conditions.	On-going, as development projects are submitted to the City for approval	City of Elko New Market	Funding by developer's fees and project specific engineering budgets
An education program for City residents, staff, and development community to be developed and implemented.	On-going	City of Elko New Market	City of Elko New Market with assistance from Scott WMO, DNR, U of M Extension Service, SWCD & VRWJPO
Amendments to the SWMP be adopted and implemented and the SWMP be updated.	As warranted by future standards or regulations	City of Elko New Market	Storm water area charge and annual engineering budget
Encourage landowners to retain areas of native vegetation, and to plant species native to the area, to protect and improve wildlife habitat and maintain the historic ecological role.	On-going, as developments are submitted to the City for approval	City of Elko New Market	Funding by developer's fees, storm water utility and project specific engineering budgets
Review City-wide street sweeping frequency	On-going	City of Elko New Market	Storm Water Utility

IX. FINANCIAL CONSIDERATIONS

The cost of implementing the Surface Water Management Plan will be supported by several revenue sources. Following are several of the sources that will be used to implement the plan. As new development occurs within the City the amount of impervious cover typically increases. This places additional burden on the existing storm sewer infrastructure by increasing the volume of storm water runoff, which also increases the amount of pollutants transferred downstream to the receiving waters. To minimize these impacts, new development and redevelopment shall implement these standards and associated rules. The City has 180 days upon approval of this plan to update City ordinances that will enforce it.

Potential Funding Source	Revenue Produced
<p><u>City's Storm Water Utility Fee</u></p> <p>The City has implemented a storm water utility fee that charges property owners on a monthly basis. The funds generated from this fee are used to finance the storm water management program.</p>	Approximately \$198,000/year
<p><u>Special Assessments</u></p> <p>The idea behind this assessment method is that generally the benefited properties pay in relation to the benefits received. The benefit would be realized by an increase in market value of the property that resulted from the improvement.</p>	Variable depending on the projects undertaken.
<p><u>Grants</u></p> <p>State and Federal grants are available for surface water management and non-point source pollution. Grants can be a good way to help fund special projects that meet grant eligibility criteria, but are not a good finance source to depend upon for an annual income source.</p>	Variable depending on the projects undertaken.
<p><u>Wetland Permit Review Fees</u></p> <p>Local government units, per M.S. 103G.2242 Sub. 5, can charge processing fees to cover the costs of implementing the rules and administrative review time. Costs could also include site evaluation and inspection of the project site.</p>	Variable depending upon the number of permits reviewed.
<p><u>Land Development Fees</u></p> <p>As new development occurs within the City, the developer pays a storm sewer trunk fee based upon the net acreage of the property, exclusive of road right-of-way and public ponding areas. If the development includes oversizing of trunk facilities, a credit for oversizing will be given to the developer. If the City determines that a development is premature, the developer will pay for oversizing.</p>	Variable depending upon the amount of development that occurs on an annual basis.

STORMWATER IMPROVEMENTS AND BMP PROGRAM							
PROJECT DESCRIPTION	ESTIMATED \$ COST	FUNDING SOURCE	ESTIMATED EXPENSE				
			2020	2021	2022	2023	2024
BACKYARD DRAINAGE IMPROVEMENTS (CITY SHARE)	\$75,000	STF	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
INSPECT STORMWATER PONDS (20% PER YEAR)	\$10,000	GF & SUF	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
STORM SEWER POND MAINTENANCE & CLEAN OUT	\$100,000	GF & SUF	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
INSPECT 20% OF ALL OUTFALLS 24" AND LARGER	\$10,000	GF & SUF	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
INSPECT EROSION CONTROL BMP'S ON ALL CONSTRUCTION SITES	\$25,000	DA, GF & SUF	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
STREET SWEEPING @2 TIMES PER YEAR	\$33,000	GF	\$6,600	\$6,600	\$6,600	\$6,600	\$6,600
PERFORM WETLAND CONSERVATION ACT LGU RESPONSIBILITIES	\$25,000	DA & GF	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
DEVELOP & DISTRIBUTE INFORMATION FLIERS ON PRE/POST CONSTRUCTION BMP'S	\$15,000	GF & SUF	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
MAINTAIN CITY WEBSITE WITH STORMWATER MANAGEMENT ISSUES	\$7,500	GF	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500
UPDATE STORM SEWER SYSTEM MAP	\$12,500	GF	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
REVIEW STORMWATER UTILITY FEE FOR SUFFICIENT OPERATING FUNDS	\$6,000	GF	\$2,000		\$2,000		\$2,000
TOTALS	\$319,000		\$64,600	\$62,600	\$64,600	\$62,600	\$64,600

DA = DEVELOPER'S AGREEMENT, GF = GENERAL FUND, STF = STORMWATER TRUNK FEE, SUF = STORMWATER UTILITY FEE

It is the current policy of the City to charge new land development a Stormwater Area Charge (SAC) to finance storm drainage improvements on a per-acre basis.

As with all improvements, there is a cost associated with prudent stormwater management. The costs incurred to achieve these improvements should be supported by new developments coming into the city through the Storm Water Area Charge. The following is an estimate of future improvement costs:

Estimated 2040 Costs	
Item	Cost
Culverts for Existing Streams and Creeks (increment over 24 inches)	\$400,000
County Road Drainage Facilities	\$2,600,000
Total Cost	\$3,000,000

As with all estimates of this nature, they are based on current construction costs and should be adjusted annually to account for inflation, bonding costs, legal costs, interest costs, etc.

Stormwater Area Charge (SAC) Cost Summary

The net developable land area in the 2040 is estimated at 3,570 acres. This results in a minimum-recommended SAC of \$840 per acre. Projected costs are only one factor, however. Existing debt service for past development-promoting investments, fund balances, development phasing and timing would be other factors the City considers in setting annual area charges. The stormwater area charge will be published annually in the City’s fee schedule.

The SAC enables the construction of, and provides for, the effective management and financing of the recommended storm water management system within the projected City growth boundary area. Existing areas of development, large wetland areas, trunk highway rights-of-way and the areas shown on the watershed drainage district map that require further analysis have been excluded from the calculation for developable acres. It is recommended that these areas be excluded in the future when computing the SAC for new development.

A. Stormwater Area Charge (SAC) Annual Inflation

The SAC should be adjusted annually for inflation or changes in conditions. As with all estimates of this nature, they are based on current construction costs and should be adjusted annually to account for inflation, bonding costs, legal costs, interest costs, etc.

B. Stormwater Area Charge (SAC) Cost Summary

The net developable land area in the 2040 is estimated at 3,570 acres. This results in a minimum-recommended SAC of \$840 per acre. Projected costs are only one factor, however. Existing debt service for past development-promoting investments, fund balances, development phasing and timing would be other factors the City considers in setting annual area charges. The stormwater area charge will be published annually in the City’s fee schedule.

The SAC enables the construction of, and provides for, the effective management and financing of the recommended storm water management system within the projected City growth boundary area. Existing areas of development, large wetland areas, trunk highway rights-of-way and the areas shown on the watershed drainage district map that require further analysis have been excluded from the calculation for developable acres. It is recommended that these areas be excluded in the future when computing the SAC for new development.

X. AMENDMENTS TO THE PLAN

A. Amendment Procedures

For the Plan to remain a dynamic, effective document, a system must be identified and available to update information and implement new ideas, methods, standards, management practices, and any other changes, which may affect the intent and/or results of the Plan. This Plan shall remain in effect for five years from its adoption date by the Council or until an amended Plan is adopted, not to exceed 10 years from the date of initial adoption. Any person or persons either residing or having business within the City may request amendment at any time. The City itself may amend this Plan at any time if changes are required or if issues or opportunities arise that are not currently addressed. All amendments shall be in accordance with Minnesota Rules 8410.0160 Subp. 4 and Minnesota Statutes 103b.235 Subd. 5.

B. Request for Amendment

The amendment process begins when a written request for a plan amendment is submitted to the City administrator. The request must outline the need for the specified amendment as well as additional materials that the City will need to consider before making its decision.

C. City Staff Review

A decision is made as to the validity of the request. Two options exist;

1. Accept the amendment as a minor issue, with minor issues collectively added to the Plan during the annual review process; and
2. Accept the amendment as a major issue, and refer the matter to the City Council for consideration. In acting on an amendment request, staff shall recommend to the City Council whether or not a public hearing is warranted.

D. Council Consideration

The amendment and the need for a public hearing shall be considered at a regular or special City Council meeting. Staff recommendations should also be considered before decisions on appropriate action(s) are made.

E. Public Hearing and Council Approval

This step allows for public input based on public interest. The City Council shall determine when the public hearing should occur in the process. Based on the Public hearing, the City Council will approve or reject the amendment.

F. Watershed Organizational Approval

Proposed amendments must be reviewed and approved by the watershed organizations according to their amendment procedures, including Metropolitan Council, prior to final adoption of the amendments by City Council.

XI. FUTURE CONSIDERATIONS

Numerous factors were considered in developing the proposed future storm sewer plan for the City. Because of the intricacies of the planned improvements, this summary report will not discuss every detail. The enclosed HydroCAD data sheets of the existing conditions can be compared with existing storm sewer data as necessary to address specific issues. However, we wish to highlight several key design features and recommendations.

A. Acquiring Space for Localized Detention

In the older more densely developed areas of the community, such as the originally platted areas and the historic downtown business and residential district areas, the possibility of acquiring space for localized detention basin construction is reduced. Throughout most of this area, new detention basin construction would require site clearing and re-platting of developed properties. Consequently, in these developed areas, water quality and detention requirements will be complicated and may require construction of regional facilities with collection piping to serve the existing/new uses. The hydrologic analyses of these areas will be reviewed on a case-by-case basis as required. Downtown Elko New Market is served by such a pond, with the intent that as redevelopment that would normally trigger stormwater management occurs, the parcel pays a cash-in-lieu of stormwater facilities fee and runoff from the site is routed to the City pond when feasible.

To meet the future Scott County, Vermillion River Watershed or possible NPDES/SDS Phase III requirements, it may be necessary to construct and/or install some form of in-line treatment that does not require a large amount of open space. Stormwater Management, Inc., Bay Saver and Stormceptor are a few of a many of in-line treatment systems being presently being incorporated into existing developed areas.

B. Flood Plains Adjacent to Corridor along the Vermillion River

The flood plain areas adjacent to the corridor along the Vermillion River and the unnamed stream along the east side of Dakota Avenue will need a hydraulic analysis as these areas develop in the future. These regions are typically protected from future development by floodplain Ordinances.

A majority of Section 20, located in the northwest corner of the study boundary area, will be limited to discharge limits that were agreed upon between the City, New Market Township and Scott County. When development occurs in this area, see Figure No. 1, runoff will be limited on a per acre basis to the amounts agreed upon in the memo, located in Appendix B.

XII. CONCLUSIONS

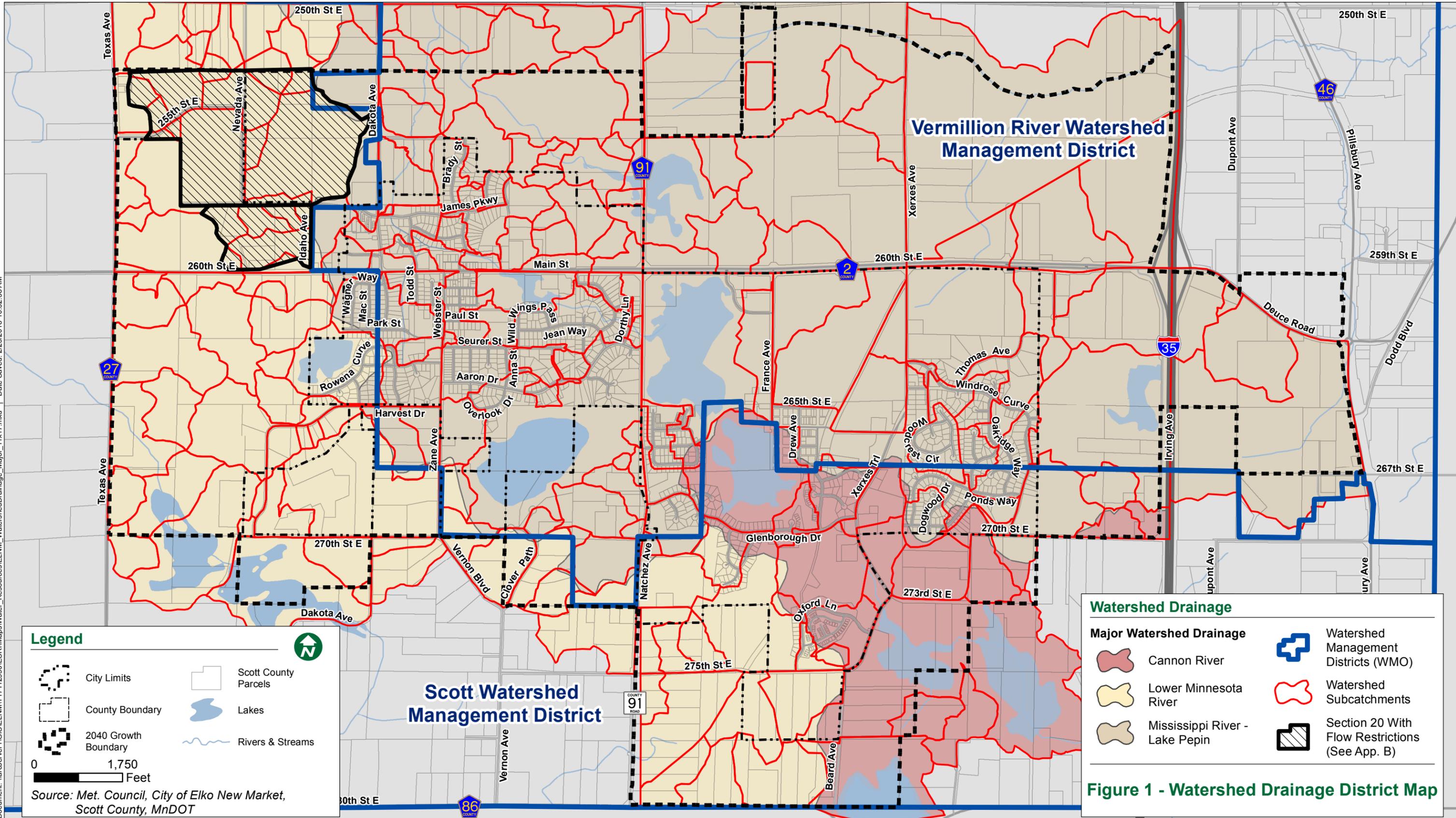
The City's existing storm sewer treatment and conveyance system cannot accommodate continued development in the growth boundary area. New development will need to include BMPs to manage runoff rate, volume, and quality and preserve existing drainage patterns.

The localized stormwater detention/water quality pond model presented in this Plan is one approach to accommodate the predicted urban development in the regional growth boundary area of the City. Further enhancement of this model must include updates on a project by project basis particularly in the event a private development will be constructing a regional pond as a condition of their permit. These updates will ensure that adjustments, due to new construction and urban development, can be coordinated with the model and regional flow rates and volumes can continually be reviewed, verified, and updated to ensure they do not exceed the numerical standards to be set by the VRWJPO. The components of the proposed SAC should also be reviewed and updated annually. These reviews will ensure that developers are paying their fair share for the improvements.

As stated earlier, this model is predominantly based on information obtained from available Scott County GIS mapping data, the City aerial and contour maps, field verification of accurate watershed boundaries, and discussions with City staff relative to the historical flooding areas. Based on all available information the modeled system closely matches qualitative descriptions given by individual observation. We believe this Comprehensive Surface Water Management Plan has significant benefit as a planning, engineering, and design tool. However, this Plan and the regional and localized stormwater and water quality pond network model is not necessarily the only method of accomplishing the goal of comprehensive surface water management. The quality and accuracy of this model may be further validated with more detailed survey data at the time of proposed development in the regional growth area of the City.

Appendix A: Maps

Watershed Drainage District Map	Figure No. 1
Digital Aerial Photographic Map	Figure No. 2
Scott County Soils Map	Figure No. 3
Scott County Wetlands and Bluff Areas Map	Figure No. 4
DNR Protected Waters Map	Figure No. 5
Floodplain Map	Figure No. 6
Future Land Use Map	Figure No. 7
Waterway Corridor Classification Map	Figure No. 8



Watershed Drainage

	Cannon River		Watershed Management Districts (WMO)
	Lower Minnesota River		Watershed Subcatchments
	Mississippi River - Lake Pepin		Section 20 With Flow Restrictions (See App. B)

Legend

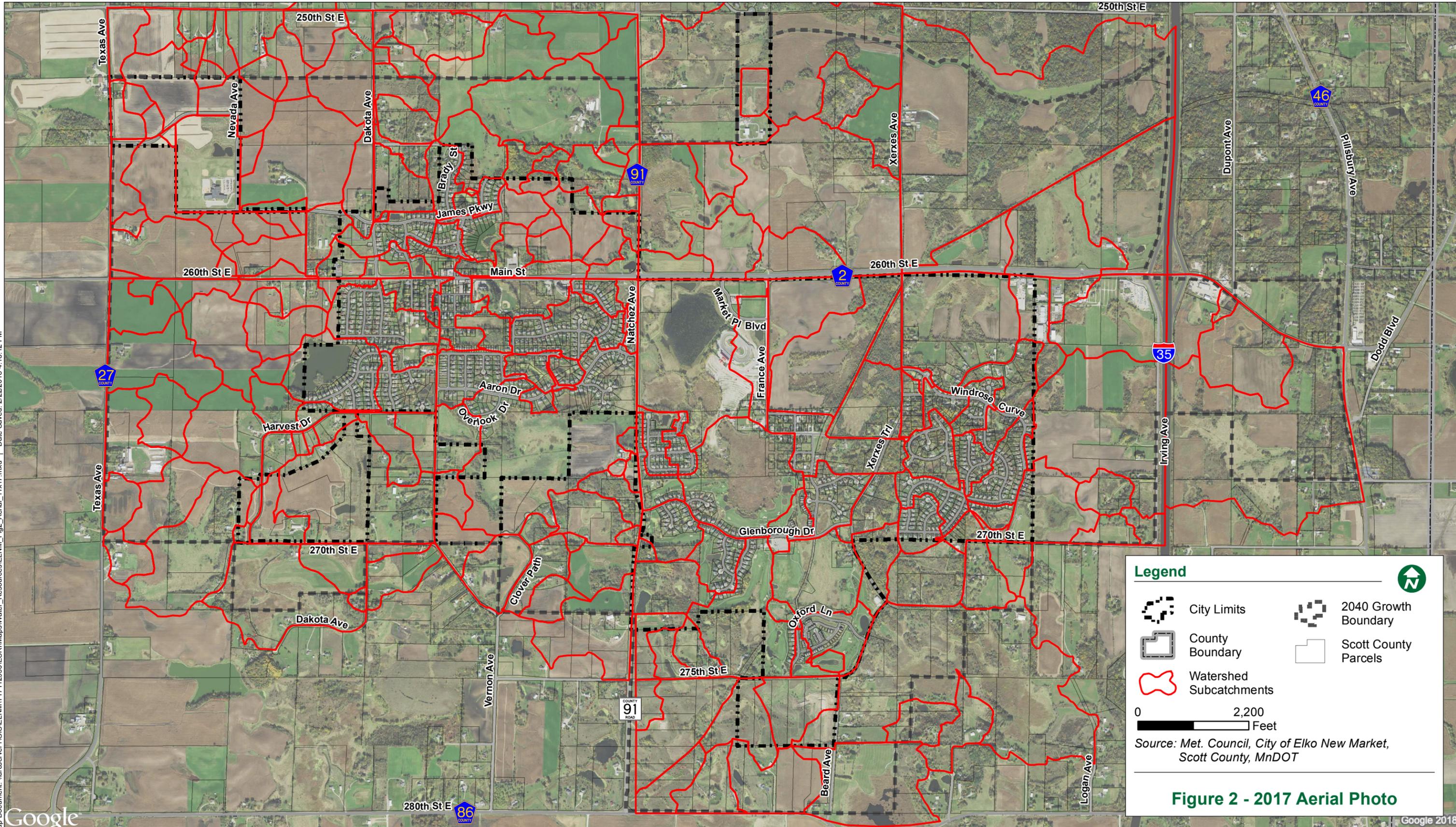
	City Limits		Scott County Parcels
	County Boundary		Lakes
	2040 Growth Boundary		Rivers & Streams

0 1,750 Feet

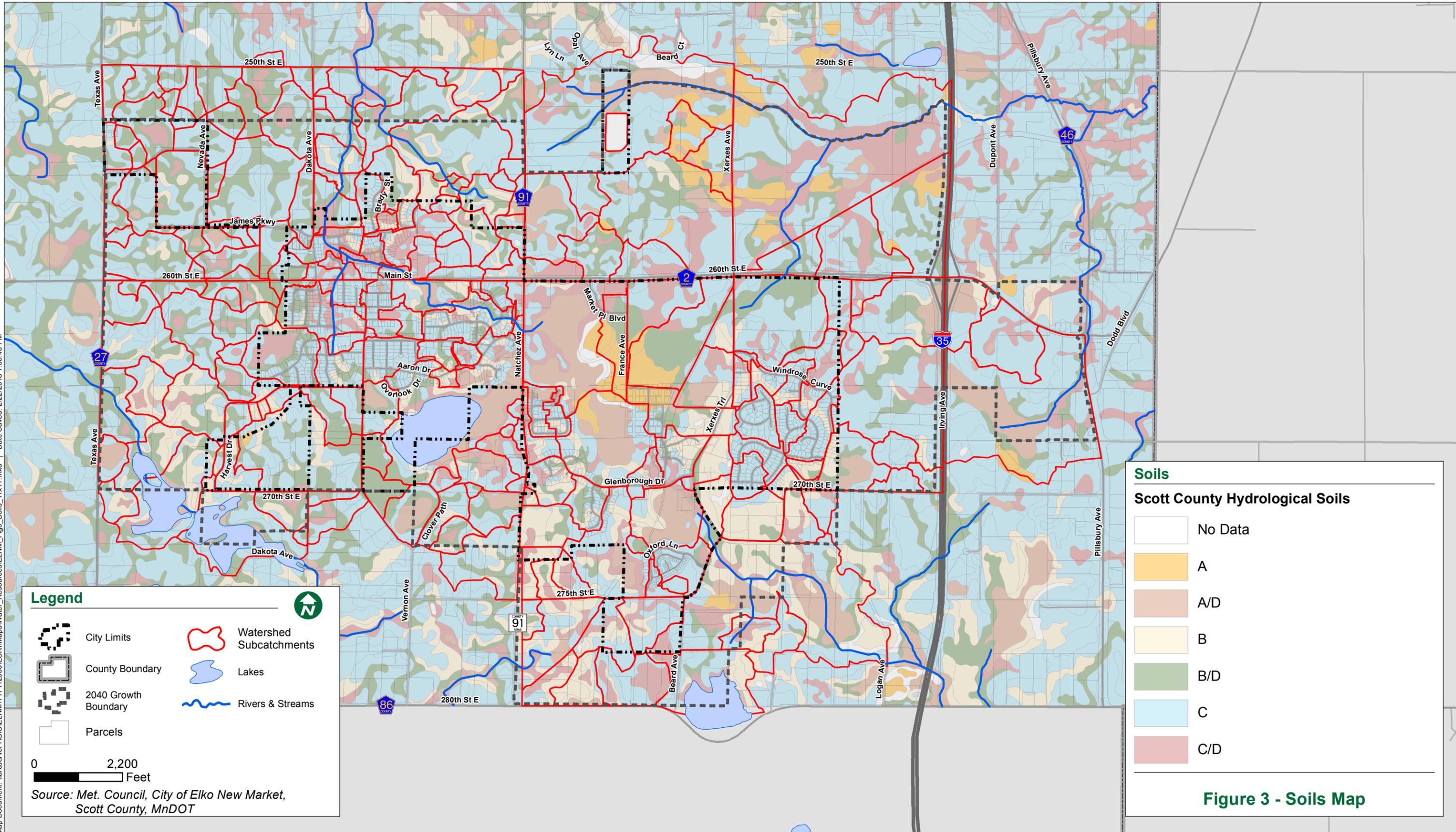
Source: Met. Council, City of Elko New Market, Scott County, MnDOT

Figure 1 - Watershed Drainage District Map

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Soils

Scott County Hydrological Soils

	No Data
	A
	A/D
	B
	B/D
	C
	C/D

Figure 3 - Soils Map

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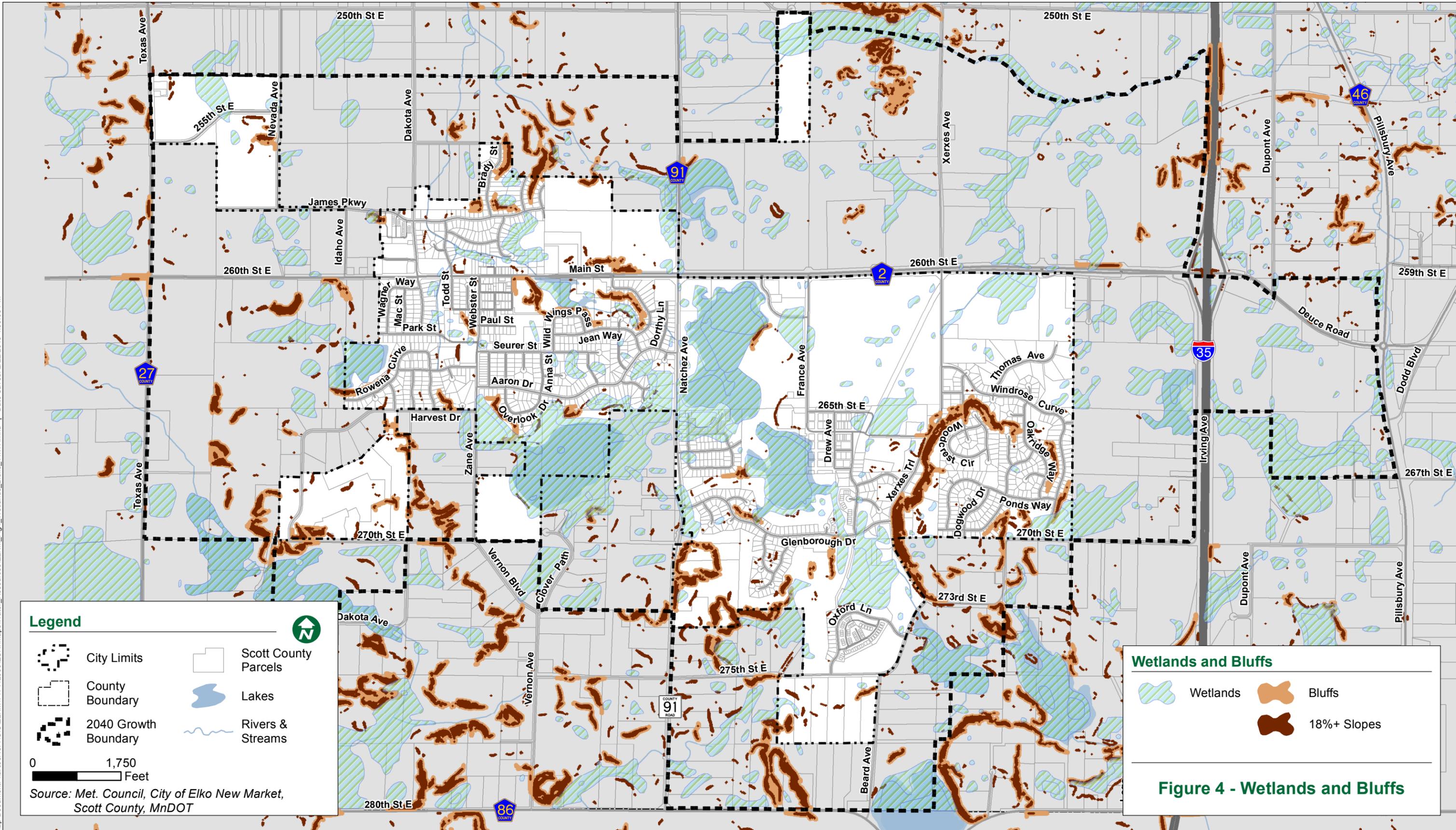
Legend

	City Limits		Watershed Subcatchments
	County Boundary		Lakes
	2040 Growth Boundary		Rivers & Streams
	Parcels		

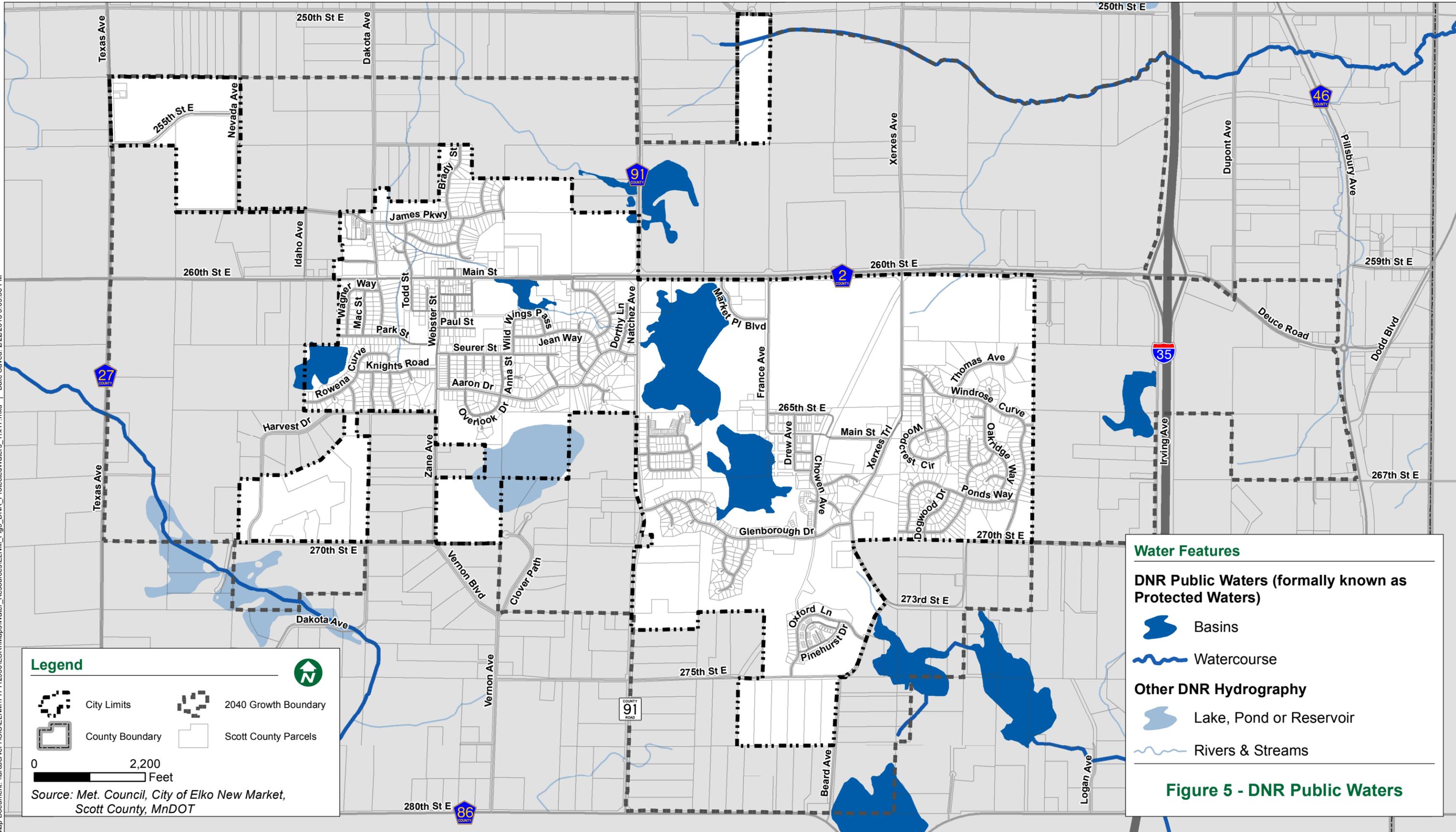
0 2,200 Feet

Source: Met. Council, City of Elko New Market, Scott County, MnDOT

Map Document: \\arcserver1\GIS\ELN\MT1712950\ESRI\Map\Water_Resources\ELNM_Fig4_Wetlands_Bluffs_11x17.mxd | Date Saved: 2/22/2018 4:59:03 PM



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Legend

- City Limits
- 2040 Growth Boundary
- County Boundary
- Scott County Parcels

0 2,200 Feet

Source: Met. Council, City of Elko New Market, Scott County, MnDOT

Water Features

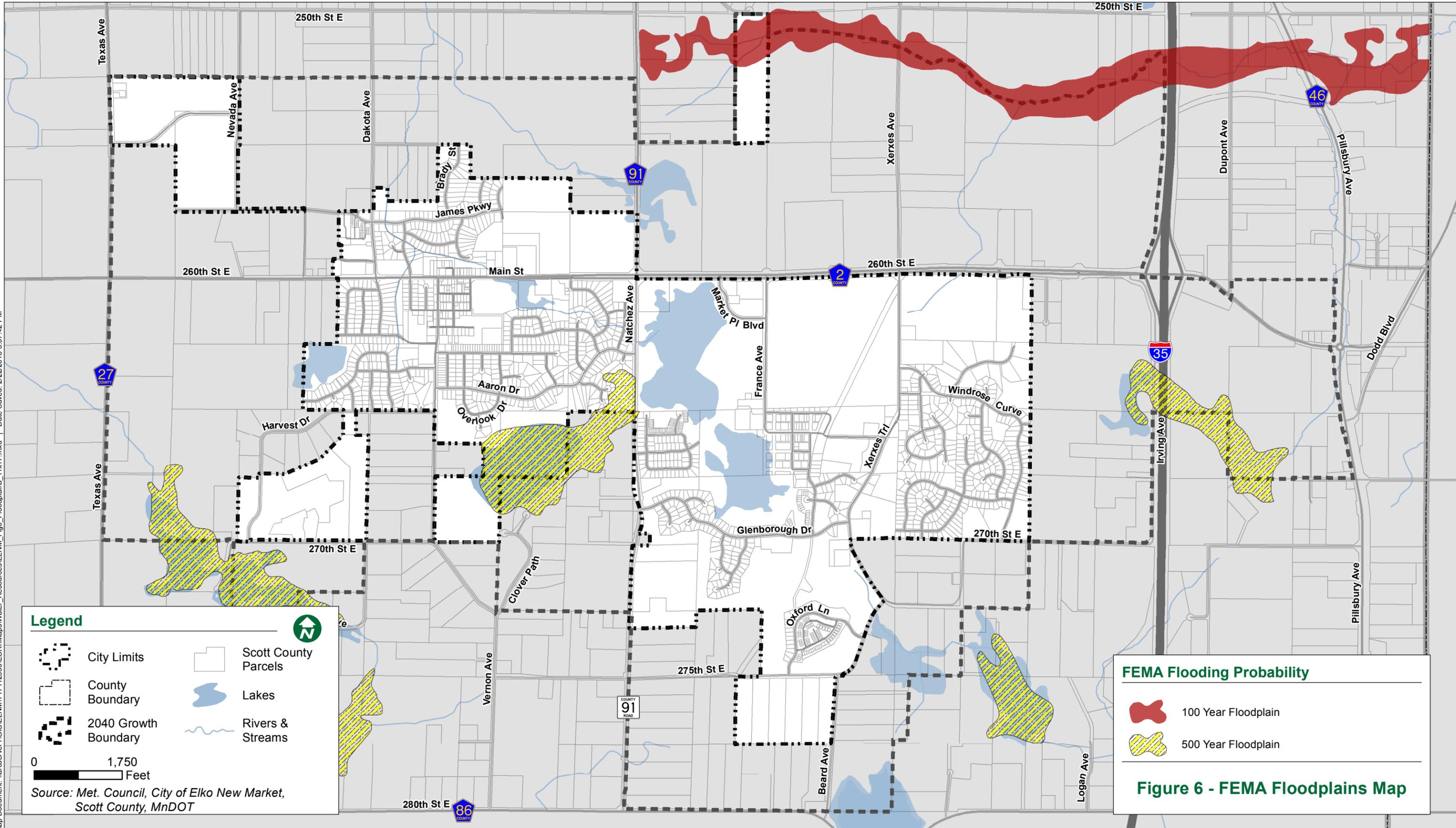
DNR Public Waters (formally known as Protected Waters)

- Basins
- Watercourse

Other DNR Hydrography

- Lake, Pond or Reservoir
- Rivers & Streams

Figure 5 - DNR Public Waters



Legend

- City Limits
 - County Boundary
 - 2040 Growth Boundary
 - Scott County Parcels
 - Lakes
 - Rivers & Streams
- 0 1,750 Feet
- Source: Met. Council, City of Elko New Market, Scott County, MnDOT

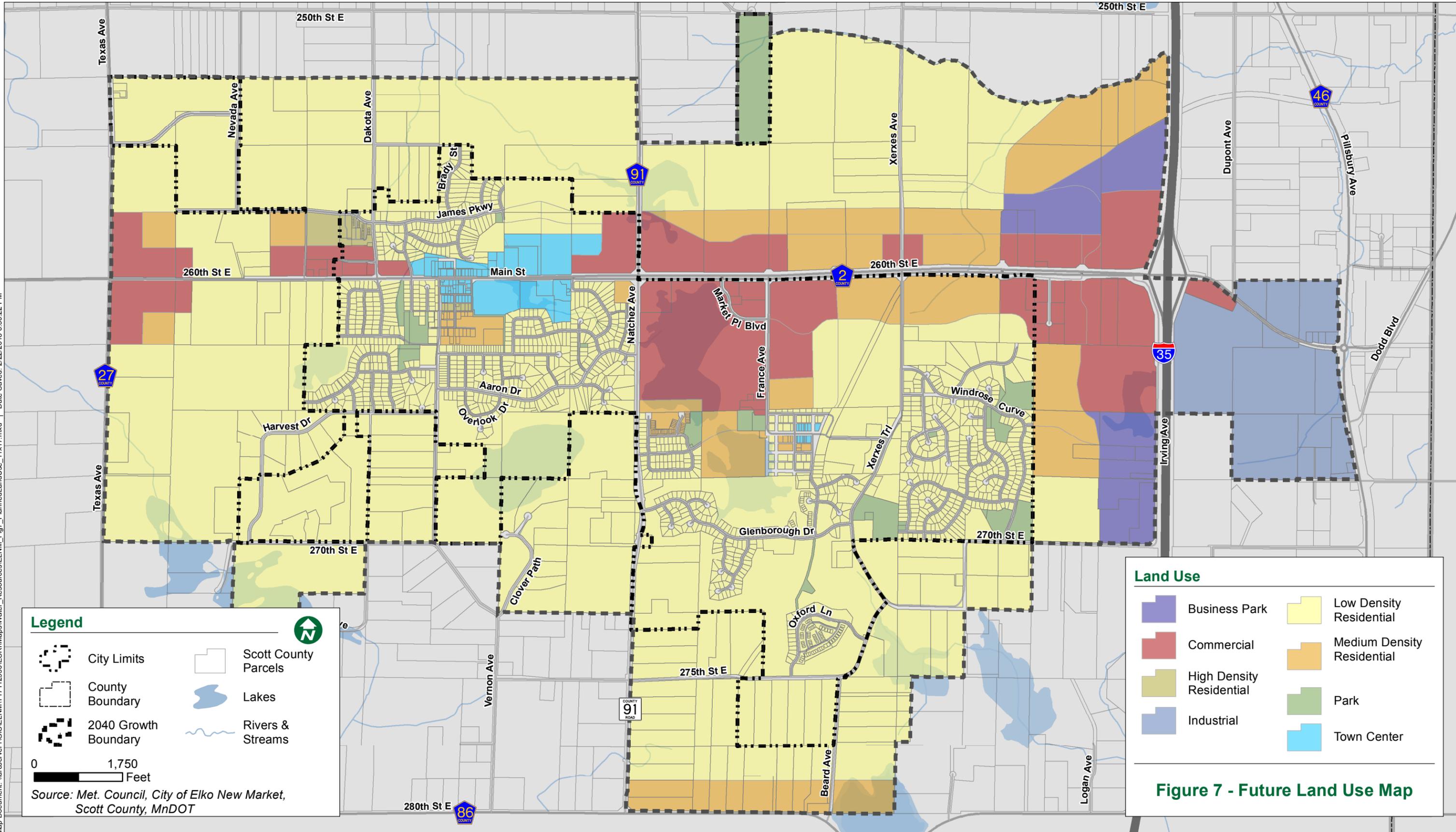
FEMA Flooding Probability

- 100 Year Floodplain
- 500 Year Floodplain

Figure 6 - FEMA Floodplains Map

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Map Document: \\arcserver1\GIS\ELNM\112950\ESR\Map\Water_Resources\ELNM_Fig7_PlannedLandUse_11x17.mxd | Date Saved: 2/22/2018 6:30:22 PM



Legend

	City Limits		Scott County Parcels
	County Boundary		Lakes
	2040 Growth Boundary		Rivers & Streams

0 1,750 Feet

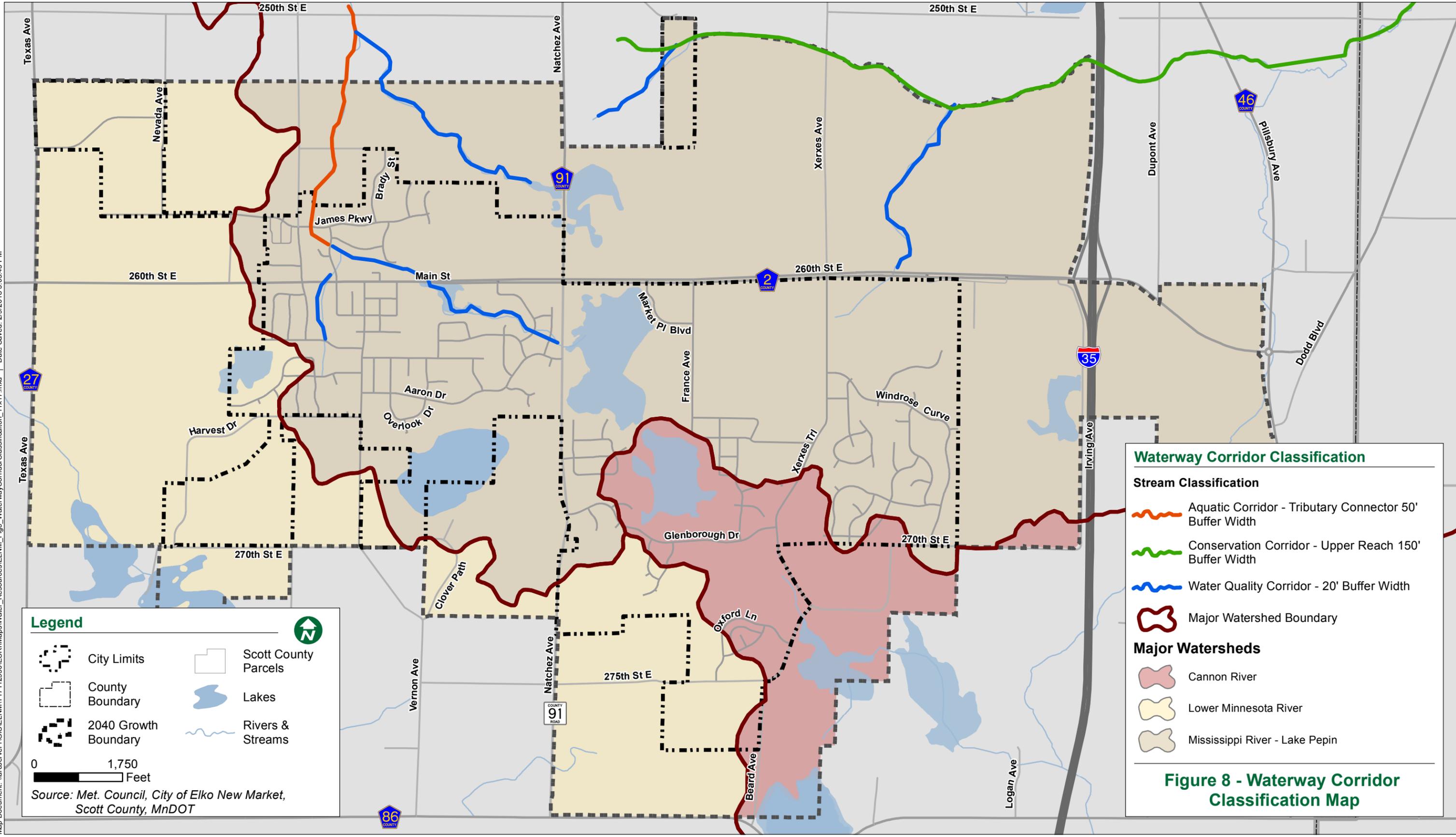
Source: Met. Council, City of Elko New Market, Scott County, MnDOT

Land Use

	Business Park		Low Density Residential
	Commercial		Medium Density Residential
	High Density Residential		Park
	Industrial		Town Center

Figure 7 - Future Land Use Map

Map Document: \\arcserver1\GIS\ELNM\1712950\ESRI\Map\Water_Resources\ELNM_Fig8_WaterwayCorridorClassification_11x17.mxd | Date Saved: 2/9/2018 3:05:45 PM



Legend

	City Limits		Scott County Parcels
	County Boundary		Lakes
	2040 Growth Boundary		Rivers & Streams

0 1,750 Feet

Source: Met. Council, City of Elko New Market, Scott County, MnDOT

Waterway Corridor Classification

Stream Classification

- Aquatic Corridor - Tributary Connector 50' Buffer Width
- Conservation Corridor - Upper Reach 150' Buffer Width
- Water Quality Corridor - 20' Buffer Width

Major Watershed Boundary

Major Watersheds

- Cannon River
- Lower Minnesota River
- Mississippi River - Lake Pepin

Figure 8 - Waterway Corridor Classification Map

Appendix B: Section 20 Discharge Agreement

May 1, 2006

To: New Market Town Board

Copy: Albert Zweber, Township Clerk
Eric Braaten, Township Attorney

From: Scott Young

Subject: **Drainage and Utilities Easement
City of New Market Trunk Storm Sewer
Earth Tech Project No. 90566.01**

On April 29th we received updated information from Thatcher Engineering, the City of New Market's engineer, regarding issues discussed at the March 30th meeting. These materials include a memo from Thatcher Engineering, dated April 27, 2006, and a memo from Wenck Associates, Inc., dated April 24, 2006, both of which are attached.

As summarized in the Thatcher memo of April 27th, the City's proposal meets the significant concerns raised during our review of the proposed project. In short, the proposal:

- is based on pre-settlement conditions,
- limits discharges for design storm events on a per acre basis,
- emphasizes the use of BMP's, infiltration and Low Impact Development methods,
- maintains existing drantile for school road, and
- minimizes the potential for run-on from undeveloped properties to adjacent roads.

Given the revisions to the plan incorporated in this latest material, we believe the New Market Town Board may allow the use of its drainage and utilities easement for the City of New Market's trunk storm sewer.

We are available on Tuesday evening if you have questions regarding this matter.



Thatcher Engineering, Inc.
3055 Old Highway 8, Suite 103
Minneapolis, MN 55418-2500
Phone: (612) 781-2188
Fax: (612) 781-2241

MEMORANDUM

To: Thomas Borchert, Earth Tech
Thomas Meyer, Scott County

From: Rich Revering, City Engineer

CC: Thomas Terry, City Administrator
Andrea McDowell Poehler, City Attorney

Date: April 27, 2006

Re: New Market Township Right of Way Permit and Scott County Grading Permit
Trunk Storm Sewer Installation – School Core Street and Utility Project

Our office has completed a follow-up of the issues discussed during our March 30th meeting. The results are presented below in italics following a brief description of each issue:

1. Provide the geotechnical report for the school road project to each party.

Done.

2. Review watershed modeling

Wenck Associates represents several watersheds in the metro area and has watershed experience in Scott County. We asked them to review the Hydrocad models prepared by our office. A memorandum summarizing their tasks and findings is enclosed.

We concur with their findings and have also attached the revised HydroCAD model for presettlement conditions.

3. Apportion peak flows from smaller storms for setting future development discharge limits. Combined pond discharges must not exceed presettlement conditions.

The City will limit release rates from developments in the watershed to the following presettlement rates:

<i>1-year</i>	<i>No peak discharge</i>
<i>2-year</i>	<i>.008 cfs/acre</i>
<i>10-year</i>	<i>.044 cfs/acre</i>
<i>100-year</i>	<i>.150 cfs/acre</i>

We will require developers provide a draitile/filtration system in future ponds that will prevent any release through the control structures for 1-year storms or smaller. Release for these small events will only occur via filtration in the ponds. This requirement will have water quality and temperature

benefits for the stream, and outflows from ponds will contribute to stream base flow rather than peak discharges.

4. Subwatershed plan

The City will present a subwatershed plan focusing on the following issues in addition to the modeling already completed and the requirements listed above. The plan will be completed by July 30th, 2006 and will guide any future developments in this subwatershed until such time as a comprehensive local water plan is completed for the City as required by State Statute.

- a. *Identify and preserve any infiltration opportunities in the watershed.*
- b. *Define and require the use of Low Impact Development techniques where feasible.*
- c. *Set forth a draintile policy that benefits receiving waters.*

5. Modify school road plans to prevent any run-on from undeveloped property to roads or account for run-on in ponding to be built as part of the school or On-Site/Wagner project.

The Contractor for the school road project has been notified of this requirement and we are currently preparing this plan revision. Low berms will be placed in boulevards where run-on could occur and existing tile systems will be preserved or modified as necessary to drain the resulting low points with no connection to the trunk sewer.

6. Modify school road plans to require existing tile be reconnected only – not intercepted by the City storm sewer.

The Contractor for the school road project has been notified of this requirement and we are currently preparing this plan revision. Non-perforated tile will be placed across the City's rights of way to carry flow from existing tile systems across the roadway. We are using non-perforated tile to minimize backflow into imported granular subgrades.

This project will enable the City to control stormwater runoff from future developments in a manner that will eventually reduce overland flows and flooding in the lower end of the subwatershed while meeting the common goal of preserving existing drainage patterns and minimizing downstream impacts. On behalf of the City, we request your recommendation to approve the respective permits based on the commitments stated above.

End of Memo

Memorandum

1800 Pioneer Creek Center, Maple Plain, MN 55359
Phone: 763-479-4200 Fax: 763-479-4242



Wenck

To: Rich Revering, P.E., Thatcher Engineering Inc.

From: Chris Meehan, P.E, Wenck Associates, Inc.

Date: April 24, 2006

Subject: New Market Township Right of Way Permit and Scott County Grading Permit Trunk Storm Sewer Installation – School Core Street and Utility Project.

INTRODUCTION

After our meeting last week, Wenck Associates, Inc. was requested to review and provide a summary of the hydrology associated with the 2005 School Core Street and Utility Improvements. Thatcher Engineering Inc. supplied for review a HydroCAD model and drainage map for pre-settlement, existing and future conditions.

The following concerns of New Market Township and Scott County were also to be included in the review:

- Accuracy of hydrologic model calculated flows and volumes, and verification of the validity of Curve Numbers used in the model.
- How peak flow rates would be apportioned for the 1, 2, 10, and 100-year storms in the watershed, thus allowing the establishment of discharge limits for future developments.

The remainder of this memo will summarize the model review and address agency concerns.

APPROACH

Upon receiving the HydroCAD model and drainage map for the site, several review actions were taken to validate the hydrologic and hydraulic characteristics of the watershed. These actions included:

- Verify accuracy of drainage boundaries with 2-foot contour map.
- Review soils for proper Hydrologic Soil Group classification.
- Confirm SCS Curve Number used in model.
- Evaluate Time of Concentration (T_c).
- Confirm overland and channel flow patterns.

Initial review of the model demonstrated that it was reasonably representing the watershed; however, a few changes to the HydroCAD model were required. These changes included:

- Additional field reconnaissance revealed an additional 7-acres drains south into the study area through an 18" CMP across 250th Street into subwatershed 8SB.
- Overland flow routes were identified which show Pond 16P flows into pond 13P vs. pond 24P. Therefore, the storage for ponds 13P, 15P, and 16P was combined since pond 13P outlet elevation would control the bounce in these ponds.
- Subwatersheds 8SC and 9SB were redelineated to better reflect surface drainage patterns. Subwatershed 8SC drains directly to pond 24P, where previously it drained to pond 14P then 24P. The redelineation also resulted in a new watershed (8SD), which drains directly to pond 14P.
- A new pond, 25P, was added to reflect a lowland area in subwatershed 9SB. Pond 25P discharges east into pond 14P.

RESULTS

After incorporation of these revisions, the model results were reviewed to determine 100-year flow rates for existing and presettlement conditions. A ratio of peak flow rate to drainage area is provided as a method to apportion flows in the watershed. Table 1 provides the results of the HydroCAD model.

Table 1. HydroCAD results for 100-year event (6.0")

Drainage Condition	Peak Flow at Outlet (cfs)	Ratio of Peak Flow to Drainage Area (cfs/ac)*
Existing	60.4 cfs	0.17 cfs/ac
Presettlement	52.5 cfs	0.15 cfs/ac

*Contributing Drainage Area = 350 acres

The ratio of peak flow to drainage area is similar to previous work completed by Wenck which found a ratio of 0.15 cfs/acre.

A 48" RCP trunk storm sewer is proposed to serve this drainage area, and based on full flow conditions the pipe will have a capacity of 60 cfs demonstrating it will have adequate capacity to convey peak flows from the site.

Agencies also requested the evaluation of existing conditions for the 1,2, and 10-year events. Table 2 provides a summary of the additional modeling.

Table 2. HydroCAD results for 1, 2, 10-year event (2.4", 2.8", and 4.25")

Drainage Condition	Peak Flow at Outlet (cfs)	Ratio of Peak Flow to Drainage Area (cfs/ac)*
1-year	5.8 cfs	0.02 cfs/ac
2-year	8.9 cfs	0.03 cfs/ac
10-year	19.5 cfs	0.06 cfs/ac

*Contributing Drainage Area = 350 acres

SUMMARY

Review of the modeling resulted in a 25% reduction in existing peak flow rates due to additional field reconnaissance and storage correction. The revised modeling provides reasonable representation of existing conditions and provides a defensible peak flow rate on which to base rate control requirements for the watershed.

Modeling results also indicate that the proposed 48" RCP will have adequate capacity to convey the 100-year event, limiting the chance for any overland flooding on the site.

To achieve existing rates to the trunk storm sewer future development should be limited to a rate of 0.17 cfs/acre for the 100-year event. Subsequent lesser year events (1, 2, and 10-year) should also meet their apportioned rate (0.02, 0.03, 0.06 cfs/ac). Rate control values provided do not incorporate the benefits of infiltration, drantile, or Low Impact Development techniques, which should be used to meet the established criteria.

Appendix C: Hydroperiod Guidelines for Wetlands

HYDROPERIOD GUIDELINES FOR WETLANDS

Recommended Hydroperiod Standards for Wetlands (Source: State of Minnesota Storm-Water Advisory Group, 1997)				
Hydroperiod Standard	Susceptible		Non-Susceptible	
	Highly Susceptible Wetlands	Moderately Susceptible Wetlands	Slightly Susceptible Wetlands	Least Susceptible Wetlands
Storm Bounce	Existing	Existing plus 0.5 ft	Existing plus 1.0 ft	No limit
Discharge Rate from Wetland	Existing	Existing	Existing or less	Existing or less
Inundation Period* for 1 & 2 –Year Precipitation Event	Existing	Existing plus 1 day	Existing plus 2 days	Existing plus 7 days
Inundation Period for 10 –Year Precipitation Event & Greater	Existing	Existing plus 7 days	Existing plus 14 days	Existing plus 21 days
Run-Out Control Elevation (Free Flowing)	No change	No change	0 to 1.0 feet above existing run out	0 to 4.0 feet above existing run out
Run-Out Control Elevation (Landlocked)	Above delineated wetland	Above delineated wetland	Above delineated wetland	Above delineated wetland

*Inundation period is the time above the normal water level (NWL)

Source: State of Minnesota Stormwater Manual, November 2005, Chapter 10, Volume 2, Page 35.