



**The Corporation of the City of Grand Forks
Committee of the Whole Meeting
AGENDA**

Meeting #: C-2018-05
Date: Monday, May 7, 2018, 9:00 am
Location: 7217 - 4th Street, City Hall Council Chambers

Pages

1. CALL TO ORDER

2. COMMITTEE OF THE WHOLE AGENDA

- a. Adopt agenda
May 7, 2018, Committee of the Whole

Recommendation

THAT the COTW adopts the May 7, 2018, agenda as presented.

3. MINUTES

- a. Adopt Minutes - Committee of the Whole
April 9, 2018, Committee of the Whole Meeting Minutes

1 - 9

Recommendation

THAT the COTW adopts the April 9, 2018, Committee of the Whole Minutes as presented.

4. REGISTERED PETITIONS AND DELEGATIONS

- a. Gallery 2
2017/2018 year-end report and 2018/2019 budget

5. REGIONAL TOPICS FOR DISCUSSION - WITH AREA D

6. PRESENTATIONS FROM STAFF

- a. Memo - Floodplain Mapping Risk Assessment
Development and Engineering Services

10 - 11

Recommendation

THAT the Committee of the Whole receives for information the memorandum from Development and Engineering Services regarding floodplain mapping risk assessment.

- b. James Donaldson Park Accessibility Upgrades
Development & Engineering Services

12 - 13

Recommendation

THAT the Committee of the Whole recommends to Council to approve the Grand Forks International Baseball (GFI) Tournament Organizing Committee undertaking accessibility improvements to James Donaldson Park, at the May 7, Regular Meeting;

AND FURTHER THAT the Committee of the Whole recommend to Council to approve in-kind contributions of labour and materials, if necessary for completion of the project, to a maximum contribution of \$_____, at the May 7, Regular Meeting.

- c. Sewer Phasing Plan Draft Report
Development and Engineering Services

14 - 82

Recommendation

THAT the Committee of the Whole receives the report on the Sewer Phasing Plan;

AND FURTHER THAT the Committee of the Whole recommends to Council to adopt the Sewer Phasing Plan report at the May 7, 2018, Regular Meeting.

- d. Urban Systems Ltd. – Delegation on SSAT (Service Sustainability Assessment Tool)
Corporate Services / Administration

83 - 85

Recommendation

THAT the COTW recommends that Council receives the information, as provided by Urban Systems Ltd., and refers the matter to the May 7, 2018, Regular Meeting for consideration to adopt the Service Sustainability Assessment Tool as a reporting tool for use towards determining the City's performance measurements.

- e. Monthly Highlight Reports
Department Managers

86 - 90

Recommendation

THAT the COTW receives the monthly highlight reports from department managers.

7. REPORTS AND DISCUSSION

8. PROPOSED BYLAWS FOR DISCUSSION

- a. Bylaw 1958-A5 Fees and Charges Bylaw Amendment – Business Fees and Charges
Development and Engineering Services

91 - 94

Recommendation

THAT the Committee of the Whole recommends to Council to give the first three readings to the "City of Grand Forks Fees and Charges Amendment Bylaw No. 1958-A5, 2018" at the May 22, 2018, Regular Meeting.

9. INFORMATION ITEMS
10. CORRESPONDENCE ITEMS
11. LATE ITEMS
12. REPORTS, QUESTIONS AND INQUIRIES FROM MEMBERS OF THE COUNCIL (VERBAL)
13. QUESTION PERIOD FROM THE PUBLIC
14. ADJOURNMENT



The Corporation of the City of Grand Forks
Committee of the Whole
MINUTES

Meeting #: C-2018-04
Date: Monday, April 9, 2018, 9:00 am
Location: 7217 - 4th Street, City Hall Council Chambers

Present: Mayor Frank Konrad
Councillor Julia Butler
Councillor Chris Hammett
Councillor Colleen Ross
Councillor Christine Thompson
Councillor Beverley Tripp

Absent: Councillor Neil Krog (with notice)

Staff: Diane Heinrich - Chief Administrative Officer / Corporate Officer
Daniel Drexler - Deputy Corporate Officer
Juliette Rhodes - Chief Financial Officer
David Reid - Manager of Operations
Dolores Sheets - Manager of Development & Engineering Services
Dale Heriot - Fire Chief
Graham Watt - Senior Planner
Bud Alcock - Bylaw Enforcement Officer

GALLERY

1. CALL TO ORDER

The April 9, 2018, Committee of the Whole Meeting was called to order at 9:00 am.

2. COMMITTEE OF THE WHOLE AGENDA

- a. Adopt agenda

April 9, 2018, Committee of the Whole

Moved by: Ross

THAT the COTW adopts the April 9, 2018, agenda as presented.

Carried

3. MINUTES

- a. Adopt Minutes - Committee of the Whole

March 12, 2018, Committee of the Whole Meeting Minutes

Moved by: Thompson

THAT the COTW adopts the March 12, 2018, Committee of the Whole Minutes as presented.

Carried

4. REGISTERED PETITIONS AND DELEGATIONS

- a. Sergeant Fenske, Grand Forks RCMP

Annual report on RCMP activities in Grand Forks

Sergeant Fenske introduced Tim Olmstead (the new regional head of the RCMP service) and further gave an overview of the RCMP report presented, including:

- staffing changes
- staffing challenges and promotion process for his replacement
- impact of regional events to the local RCMP force
- 2016 and 2017 statistics
- 2018 focuses and priorities

The RCMP is currently waiting on Cannabis legalisation and laws being finalized before completing plans on how to manage the enforcement or

being able to comment on how the legalisation would impact areas of the municipality.

b. Boundary Country Regional Chamber of Commerce

Quarterly Report

The BCRCC advised that due to medical emergencies they regretfully were unable to attend as a delegation and therefore the BCRCC report was deferred to the Regular Meeting of Council on April 23, 2018.

c. Grand Forks Wildlife Association

Request to grant a Licence to Occupy for a portion of City property located just west of the City landfill

Frank Usselman, a director of the GFWA, gave a review of the submitted report.

He advised that a Licence to Occupy is necessary at this point to receive approval from the inspector.

The Manager of Development and Engineering advised that zoning issues would need to be resolved at this point and some historical research completed before a licence to occupy could be issued.

Moved by: Thompson

THAT Staff be asked by Council to bring back a report to a Regular Meeting of Council regarding the Licence to Occupy that includes historical and zoning related research.

Carried

5. REGIONAL TOPICS FOR DISCUSSION - WITH AREA D

6. PRESENTATIONS FROM STAFF

a. Temporary Use Permit for Tourist Commercial / Special Event Camping

Development and Engineering Services

Discussion ensued regarding:

- notification to surrounding properties as part of legislatively required process
- proposed notification plan

- potential zoning changes - not recommended by staff at this point due to future potential use of the property
- proposed infrastructure and fencing

Moved by: Thompson

THAT the Committee of the Whole recommends to Council at the April 9, 2018, Regular Meeting to direct staff to proceed with statutory requirements for public notice of the decision at April 23, 2018, Regular Meeting regarding the Temporary Use Permit for Tourist Commercial / Special Event Camping purposes on land zoned Small Lot Residential (R-2), legally described as Lot 1 District Lots 380 & 520 SDYD Plan KAP64274.

Carried

b. Tree Policy

Outside works

Discussion ensued regarding:

- proposed amendment to replace every tree
- internal review process still under way which may delay the policy until May

Moved by: Ross

THAT the Committee of the Whole recommends to Council to adopt the Urban Forest Policy #1105 at the April 23, 2018, Regular Meeting.

Carried

c. Monthly Highlight Reports

Department Managers

Discussion ensued regarding:

- reservoir cleaning contract - awarded to MTS
- cleaning of boulevards
- gas tax funding grant - project plan to be presented in May

Moved by: Hammett

THAT the COTW receives the monthly highlight reports from department managers.

Carried

7. REPORTS AND DISCUSSION

8. PROPOSED BYLAWS FOR DISCUSSION

a. Bylaw 2039-A1 - Zoning Bylaw Cannabis Amendment

Development and Engineering

Discussion ensued regarding:

- proposed maps and zoning
- process regarding application of constraints by staff for each business request
- public hearing will be required as part of the process after the initially proposed two readings
- third and final readings not to occur until provincial and federal guidelines are completed
- buffered industrial land zone would be only zone that allows manufacturing
- potential impact to residences in close proximity to manufacturing operations
- currently no strict limit on total retail spaces available, however, constraints will dictate how many total establishments based on distances between location
- Les Johnson, GFTV, inquired regarding potential increase in crime and possible affects on youth - best to wait for provincial and federal guidelines
- Kate Saylor, Grand Forks Gazette, inquired about how the City could entice more public feedback compared to what is already been done. The discussion resulted in the following possible options:
 - public hearings are legislatively required
 - can't force people to attend or fill out surveys
 - potential of open house
 - potential of survey as insert in utility bills

- City uses Facebook, Gazette, Radio, Website to inform about surveys and other ways for feedback already
- Gloria Koch was concerned about the number of citizens attending City meetings and hearings
- it is due diligence for the protection of the Organization and the Municipality to implement the zoning bylaw amendment

A motion was proposed to refer the item back to staff for a more comprehensive survey through other avenues such as utility bills. The motion was defeated.

Moved by: Tripp

Seconded by: Butler

THAT the item be referred back to staff for a more comprehensive survey through other avenues such as utility bills.

Opposed (4): Konrad, Hammett, Ross, and Thompson

Defeated

Moved by: Thompson

THAT the Committee of the Whole recommends to Council to give first and second readings to Zoning Bylaw Amendment No. 2039-A1 at the April 23, 2018, Regular Meeting.

Opposed (2): Butler, and Tripp

Carried

b. Bylaw 2046 - 2018 Tax Rates

Chief Financial Officer

Discussion ensued regarding:

- tax rates options presented
- "multiples" determines distribution of taxes between the classes

A motion was proposed to select option No. 2 for the 2018 Tax Rates Bylaw and it was carried unanimously.

Moved by: Thompson

THAT the Committee of the Whole selects option No. 2 for the 2018 property tax rates and instructs staff to include option No. 2 in the 2018 Tax Rates Bylaw No. 2046;

AND FURTHER to present the 2018 Tax Rates Bylaw No. 2046 for first three readings at the April 23, 2018, Regular Meeting.

Carried

- c. Bylaw 2047 - Freedom of Information and Protection of Privacy Update
Corporate Services

Discussion ensued regarding:

- update requirements for current bylaw
- FOI fee schedules are a part of Freedom of Information and Protection of Privacy Act
- modernizing the bylaw based on the City of Kelowna's template

Moved by: Thompson

THAT the Committee of the Whole recommends to Council to give the first three readings of the proposed Freedom of Information and Protection of Privacy Bylaw No. 2047 at the April 23, 2018, Regular Meeting.

Carried

- d. Bylaw 2048 - Records and Information Management Program Bylaw update

Corporate Services

Discussion ensued regarding:

- records management program
- legislative requirements for records keeping
- various acts to follow
- disposition schedule and other items need to be updated continuously

Moved by: Thompson

THAT the Committee of the Whole recommends to Council to give the first three readings of the proposed Records and Information Management Program Bylaw No. 2048 at the April 23, 2018, Regular Meeting.

Carried

9. INFORMATION ITEMS

10. CORRESPONDENCE ITEMS

11. LATE ITEMS

12. REPORTS, QUESTIONS AND INQUIRIES FROM MEMBERS OF THE COUNCIL (VERBAL)

13. QUESTION PERIOD FROM THE PUBLIC

Phil Mauro, on behalf of his neighbour Murray Rennie, spoke regarding an emailed request to the City regarding water flow problems from the slough behind his property underneath the highway - He was advised that it is not a simple issue as the slough is meant to store water in the area and culverts are on private property and possibly under MoTI jurisdiction.

Kathy & Tim, owners of Home Hardware, inquired about the power outage scheduled for April 12, 2018 -

- costs would be passed on to all tax payers of the community
- other options are generators
- overtime costs of contractor
- not possible to do on a Sunday due to a five day schedule that needs to be completed for this part of the project, or incur extreme additional costs
- the Manager of Operations gave a history and reason why this particular outage is required and how it was scheduled for a Thursday
- water service line would be replaced at the same time
- potential safety concerns regarding later start times

14. ADJOURNMENT

The April 9, 2018, Committee of the Whole Meeting was adjourned at 11:45 am.

Moved by: Ross

THAT the Committee of the Whole Meeting be adjourned at 11:45 am.

Carried

Mayor Frank Konrad

Deputy Corporate Officer – Daniel
Drexler

DRAFT

Memo



To: Committee of the Whole
From: **Development and Engineering Services**
Date: 2018-05-07
Subject: Floodplain Mapping and Risk Assessment Project

Background

Floodplain maps were last prepared in the early 1990s. River flows and floodplain development have changed in the last thirty years, and climate change will likely further change river flows. To better prepare for flood emergencies and plan for appropriate development on the floodplain, the floodplain maps need to be updated with new data and analytical tools.

In 2017, the City successfully applied for two grants to support this work: Gas Tax Strategic Priorities Fund for \$225,700, and the Union of BC Municipalities Community Emergency Preparedness Fund for \$67,500. The City also allocated \$50,000 to leverage the grants and connect the studies with infrastructure hazard mitigation and future structural flood protection.

Three main themes will be addressed in the combined study:

- Updating hydrology and floodplain maps and incorporating climate change information;
- Evaluating risks and hazards to community, infrastructure and emergency response; and
- Highlighting the connections and provide input to community planning, emergency management, and asset management / capital planning.



The City's engineering consultant, Urban Systems, will provide a brief presentation on the conceptual approach to this project and the major tasks to be undertaken over the next year.

Benefits or Impacts

General

This project provides for emergency preparedness, fiscal responsibility and sustainability of infrastructure and natural assets.

Strategic Impact

-  Identifies natural floodplain assets / services and improves sustainability of critical infrastructure
-  Incorporates participation by stakeholders in understanding and planning related to flood hazards

Policy/Legislation

Official Community Plan; Floodplain Bylaw; Asset Management Plan; Zoning Bylaw;
Multiple provincial and federal acts.

Request for Decision



To: Committee of the Whole

From: **Development & Engineering Services**

Date: May 7, 2018

Subject: James Donaldson Park Accessibility Upgrades

Recommendation: **RESOLVED THAT the Committee of the Whole recommend to Council to approve the Grand Forks International Baseball (GFI) Tournament Organizing Committee undertaking accessibility improvements to James Donaldson Park, at the May 7 Regular Meeting;**

AND FURTHER THAT the Committee of the Whole recommend to Council to approve in-kind contributions of labour and materials, if necessary for completion of the project, to a maximum contribution of \$_____, at the May 7 Regular Meeting.

Background

The GFI (Grand Forks International) baseball tournament organizing committee sent a letter to the City asking for permission to undertake accessibility improvements at James Donaldson Park prior to this year's 37th tournament. The goal is to make the park more accessible for wheelchairs, baby strollers, and anyone who may experience difficulty navigating through the park. The committee approached a local construction company that agreed to provide the materials and labour for paving pathways as their sponsorship to the GFI. Urban Systems Ltd., the City's engineering firm, have agreed to provide in-kind engineering design support as their contribution to the community. CannaFest organizers have indicated they would like to work with the GFI Organizing Committee to improve the front gate entranceways and is willing to provide funding for this project.

The GFI Tournament Organizing Committee thanks the City for its continued support of the event and hopes the City will welcome these new upgrades to the facility.

Benefits or Impacts

General

Improved accessibility at a City-owned facility allowing for ease of use by members of the public.

Strategic Impact



Community Livability

- Continued investment in sport in Grand Forks and supporting an initiative to develop an amenity to promote inclusivity



Economic Growth

- The upgrades provide the opportunity to market this community event to a larger, more diverse audience

Policy/Legislation

City of Grand Forks Official Community Plan

Attachments

N/A

Recommendation

RESOLVED THAT the Committee of the Whole recommend to Council to approve the Grand Forks International Baseball (GFI) Tournament Organizing Committee undertaking accessibility improvements to James Donaldson Park, at the May 7 Regular Meeting;

AND FURTHER THAT the Committee of the Whole recommend to Council to approve in-kind contributions of labour and materials, if necessary for completion of the project, to a maximum contribution of \$_____, at the May 7 Regular Meeting.

Options

1. RESOLVED THAT Committee of the Whole accepts the recommendation.
2. RESOLVED THAT Committee of the Whole does not accept the recommendation.
3. RESOLVED THAT Committee of the Whole refers the matter back to staff for further information.

Request for Decision



To: Committee of the Whole
From: **Development and Engineering Services**
Date: May 7, 2018
Subject: Sewer Phasing Plan Draft Report
Recommendation: **THAT Committee of the Whole receive the report on the Sewer Phasing Plan; and further**

THAT Committee of the Whole recommend to Council to adopt the Sewer Phasing Plan report at the May 7, 2018 Regular Meeting.

Background

The City received funding under the 2017 Federal/Provincial Clean Water and Wastewater Fund to undertake a report on potential future expansion of the sewer collection system, which includes a prioritization of areas based on safeguarding the environment, the quality of the City groundwater supply, and public health.

The scope of the work is limited to those parts of the City (7 neighborhood areas) that currently do not have community sewer service (see figure 2.1). These areas utilize on-site septic tank and ground dispersal systems. It is not intended to address the functionality of the existing sewer network, which was previously examined as part of a multi-utility risk assessment exercise.

The assessment of risk factors provides a desktop overview of 5 parameters that relate to contamination risks:

- Soil types and permeability
- Slope
- Depth to groundwater
- Parcel size
- Distance to surface water and/or wells

Capital cost estimates are developed for retrofit sewer installation for each area and priority rankings are suggested for a retrofit sewer program.

The Department recommends that the Sewer Phasing Plan is utilized in the Official Community Plan and Capital Planning to service long-term needs of the City while protecting the aquifer.

Benefits or Impacts

Strategic Impact



Fiscal Accountability

- Create a plan for protecting the aquifer
- Infrastructure risk management and prioritization

Policy/Legislation

Official Community Plan; Asset Management Investment Plan

Attachments

Sewer Phasing Plan Report

Recommendation

THAT Committee of the Whole receive the report on the Sewer Phasing Plan; and further

THAT Committee of the Whole recommend to Council to adopt the Sewer Phasing Plan report at the May 7, 2018 Regular Meeting.

Options

1. RESOLVED THAT Committee of the Whole accepts the recommendation.
2. RESOLVED THAT Committee of the Whole does not accept the recommendation.
3. RESOLVED THAT Committee of the Whole refers the matter back to staff for further information.

DRAFT REPORT

PREPARED FOR THE CITY OF GRAND FORKS

Sewer Phasing Plan Study

April 2018

URBAN
systems

April 27, 2018

City of Grand Forks
PO Box 220
Grand Forks, BC V0H 1H0

Attention: Dolores Sheets

Re: Sewer Phasing Plan

Attached please find a "Draft" report on the Sewer Phasing Plan as requested. We have included an "Executive Summary" of the findings and are reserving final recommendations pending City review of this draft.

We look forward to the City's comments and completion of the assignment with your approval.

Sincerely,

A handwritten signature in blue ink, appearing to be 'Scott Shepherd', with a long horizontal line extending to the right.

Scott Shepherd, ASCT

A handwritten signature in blue ink, appearing to be 'Peter Gigliotti', with a long horizontal line extending to the right.

Peter Gigliotti, P. Eng

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APPENDICES

Appendix A Golder Report

Appendix B Unit Costs

EXECUTIVE SUMMARY

This report was commissioned by the City of Grand Forks in April 2017 and was approved for funding assistance under the Clean Water and Wastewater Fund.

The first section of the report deals with the expansion of the City's sewer collection. It is the City's long-term goal to eliminate on-site ground disposal systems by connecting to the community sewer system. Since this will happen gradually, it is the intent of this report to assess which areas represent the highest priority with respect to safeguarding the environment, the quality of the City groundwater supply, and public health.

The second part of the report deals with biosolids and the available opportunities for reclamation of biosolids. These include biosolids that have accumulated over many years in the City's lagoon system, as well as the forecast quantities of biosolids produced by the wastewater treatment plant. The treatment plant is currently undergoing an upgrade to provide equipment for sludge dewatering.

Extension of Sewer Collection System

The scope of the work is limited to those parts of the City (7 neighborhood areas) that currently do not have community sewer service (see figure 2.1). These areas utilize on-site septic tank and ground dispersal systems. It is not intended to address the functionality of the existing sewer network, which was previously examined as part of a multi-utility risk assessment exercise.

The assessment of risk factors was undertaken by Golder Associates and provides a desktop overview of 5 parameters that relate to contamination risks:

- ▶ Soil types and permeability
- ▶ Slope
- ▶ Depth to groundwater
- ▶ Parcel size
- ▶ Distance to surface water and/or wells

A copy of the Golder Associates report is located in **Appendix A**. The overall risk factor for each area represents a blend of the Final Risk Rating Overview. The risk ratings are developed as numerical ratings 1 to 4. For the purpose of the assessment, a Risk Factor of 1 is interpreted to have the lowest risk; while a Risk Factor of 4 is interpreted to have the highest risk.

The resulting classifications are as follows:

Risk 3: Hwy 3 East

Risk 2 South Ruckles, Johnson Flats, SW Grand Forks, Donaldson

Risk 1: PW/Richmond, Airport Industrial

All of the "Various" areas are classified as Risk 2. It is assumed that these areas will be Pay-as-You-Go, since they are close to existing sewer and driven by new growth. The exception is the north end Industrial parcel, which requires a long extension of sewer along Granby Road.

The rankings, areas and number of parcels in each neighbourhood are summarized in **Table 4.2**. The study also includes a resident questionnaire to provide a sense of how many property owners are experiencing any issues with wastewater surfacing or problems with their septic systems. Capital cost estimates are developed for retrofit sewer installation for each area and priority rankings are suggested for a retrofit sewer program.

Table 4.2 also includes these estimated capital costs for retrofit community sewer in each of the seven neighborhoods. A copy of the proposed expansion is located in **Figure 4.1**.

Table 4.2 – Areas, Risk Factors and \$ / Hectare

	Area	Overall Risk Factor	Area (ha)	Parcels (Dev and Undev)	Capital Cost Estimate (\$M)	Average \$ per ha
1	Hwy 3 East end	3	6	8	1.9	317,000
2	Public works & Richmond Ave Industrial	1	13	19	1.9	146,000
3	Airport / Industrial	1	40	33	1.7	42,500
4	South Ruckles	2	20	124	3.8	190,000
5	Johnson Flats	2	60	170	3.3	55,000
6	SW GF	2	53	101	2.4	45,000
7	Donaldson / NW	2	31	66	1.1	35,500

Some of the neighbourhoods have already been extensively subdivided (e.g. South Ruckles). Others consist of large parcels. The retrofit sewer quantities are based on provision of community sewer on existing roads. Collection system networks for future subdivision of large parcels are not included and are assumed to be “Pay-as-You-Go” (PYG) This means that future expansion of the sewer network would become the developer’s responsibility and would be turned over to the City when completed.

The capital cost to service each area is divided by the number of existing parcels to arrive at a value per parcel, and by the number of hectares to arrive at the cost per hectare.

Two neighbourhoods are identified for further study in the context of risk level and potential cost of servicing per hectare: Johnson Flats and Donaldson.

The city wastewater treatment plant is currently being upgraded and provision is made for increased flows from potential infill and additional service areas.

1.0 INTRODUCTION

1.1 Subject and Purpose

This report was commissioned by the City of Grand Forks in April 2017. The report is to deal with the areas of the City that do not have a community sewer and are not connected to the existing network. It is the City's long-term goal to eliminate on-site ground disposal systems by connecting to the community sewer system. Since this will happen gradually, it is the intent of this report to assess which areas represent the highest priority with respect to safeguarding the environment, the quality of the City groundwater supply, and public health. The project was approved for funding assistance under the Clean Water and Wastewater Fund.

The study also includes an assessment of how the City can deal with the biosolids produced at their wastewater treatment plant, both from past accumulation and from ongoing production.

1.2 Scope

The scope of the work is limited to those parts of the City that currently do not have community sewer service. These areas utilize on-site septic tank and ground dispersal systems. It is not intended to address the functionality of the existing sewer network, which was previously examined as part of a multi-utility risk assessment exercise.

The assessment of risk factors is undertaken by Golder Associates (see **Appendix A** for a copy) and provides a desktop overview of 5 parameters that relate to contamination risks:

- ▶ Soil types and permeability
- ▶ Slope
- ▶ Depth to groundwater
- ▶ Parcel size
- ▶ Distance to surface water and/or wells

The study also includes a resident questionnaire to provide a sense of how many property owners are witnessing any issues with wastewater surfacing or problems with their septic systems. Capital cost estimates are developed for retrofit sewer installation for each area and priority rankings are suggested for a retrofit sewer program.

The second part of the report deals with biosolids and the available opportunities for reclamation of biosolids. These include biosolids that have accumulated over many years in the City's lagoon system, as well as the forecast quantities of biosolids produced by the wastewater treatment plant. The treatment plant is currently undergoing an upgrade to provide equipment for sludge dewatering.

2.0 BACKGROUND

The sanitary sewer system in Grand Forks is comprised of a combination of individual on-site septic disposal systems and a community sanitary sewer collection system. Since the mid-1990's, Grand Forks has been committed to pursuing sanitary sewer service for all residents on a phased basis and has made some progress in providing sewer service for the community since then.

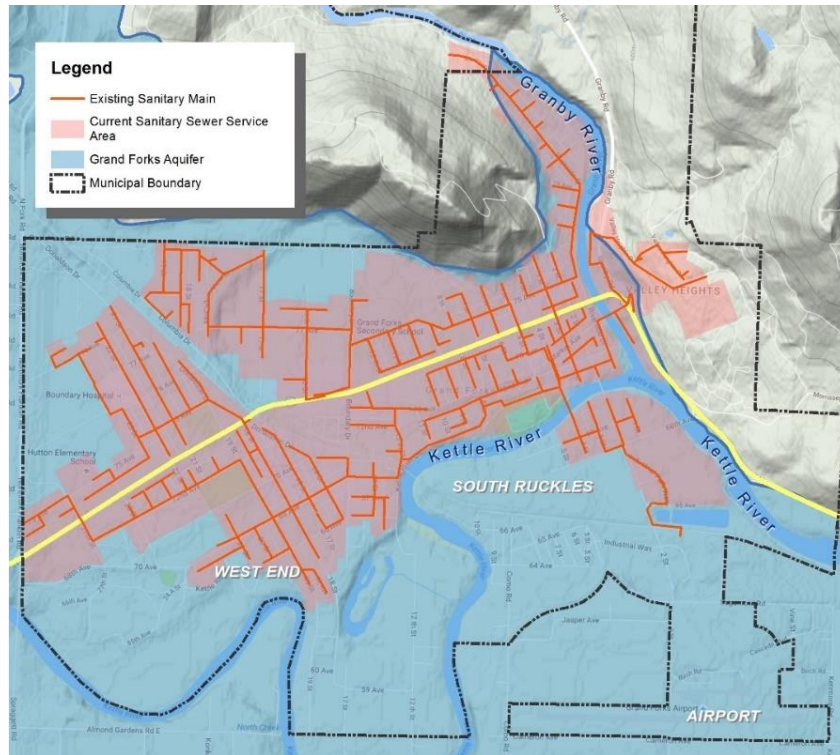
The process has recently gained community interest with the preparation of the Kettle River Watershed Management Plan (KRWMP) and the City's Well and Aquifer Protection Plan. The KRWMP identified the impacts to the water quality and quantity for both the Kettle River as well as the Grand Forks Aquifer. The unsewered areas of Grand Forks are considered to be a major source of nitrate and phosphorous loading to both the aquifer and to the Kettle River, particularly near the east end of the community where the aquifer is shallowest and the unsewered areas are located in the floodplain of the Kettle River. A key recommendation from these studies is to reduce the number of on-site septic disposal systems since they continue to age and the number of failures is expected to increase and potentially further impact the health of the public and that of the aquifer and the Kettle River.

The Grand Forks aquifer provides potable and agricultural water supply to several water utilities including the City of Grand Forks, Sion Improvement District, Grand Forks Irrigation District, Covert Irrigation District and several smaller community water systems. **Figure 2.1** below illustrates the location of the Grand Forks Aquifer in relation to the City's community sewer system.

The Kettle River is a significant tributary to the Columbia River which flows from the Monashee Mountains through the City of Grand Forks and south into the Washington State. The Kettle River is a significant community natural asset for the City and the region. In the Grand Forks region, the Kettle River provides a habitat for fish and aquatic ecosystems while enhancing several community water systems through recharging the Grand Forks aquifer. However, there are a number of cumulative impacts affecting the water quality of the Kettle River including on-septic disposal systems.

The City of Grand Forks wastewater system currently services the majority of parcels on the north side of the Kettle River and the North Ruckles area. The Airport, South Ruckles and portions of the West end directly adjacent to the Kettle River are currently not serviced with a community sewer system. **Figure 2.1** below illustrates the extents of the City's existing sewer system.

Figure 2.1 Existing Community Sewer System and Location of the Grand Forks Aquifer



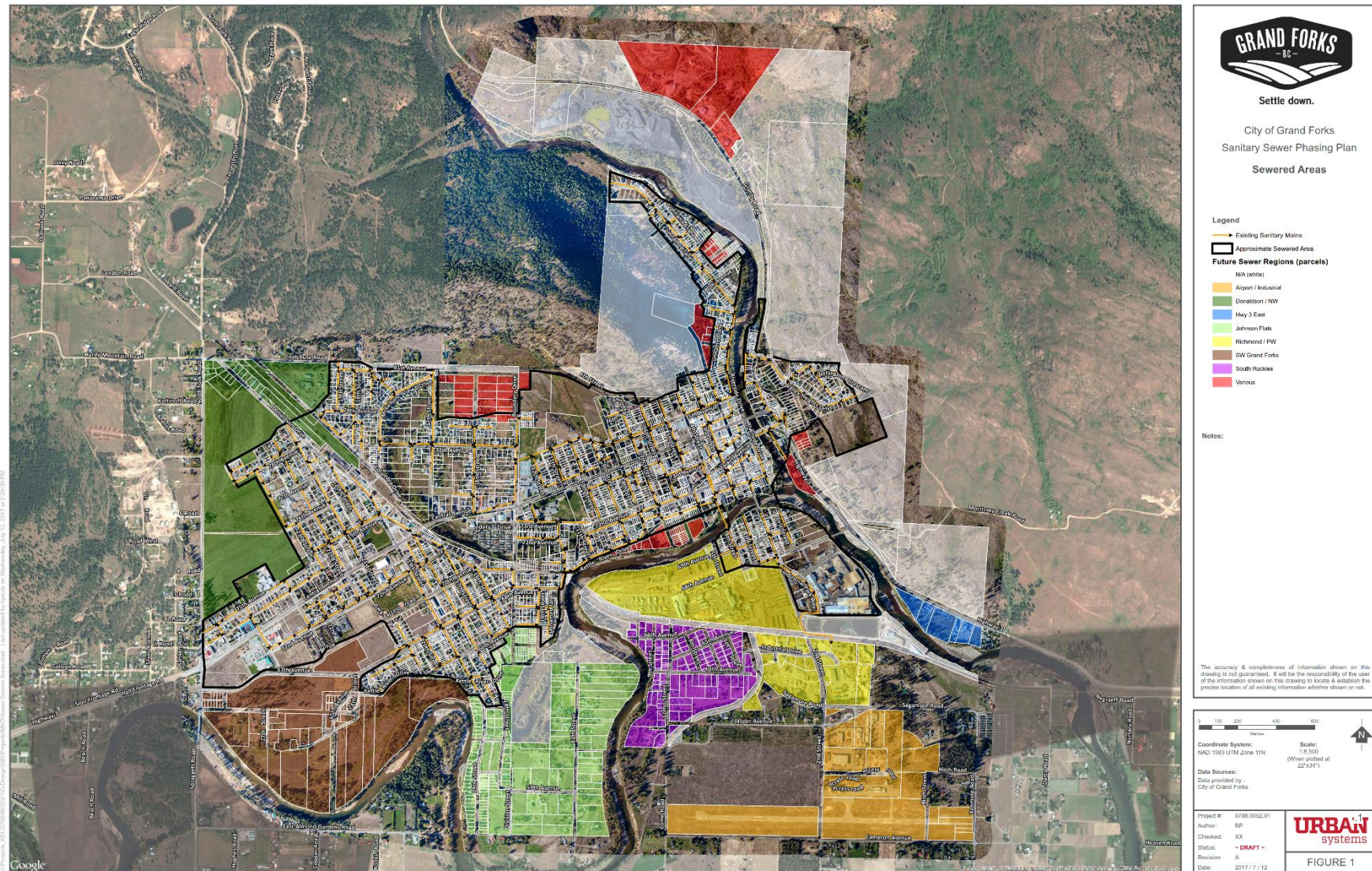
The areas and number of parcels outside of the community sewer system are as follows:

#	Location	ha	# parcels	*undeveloped	zoning
1	Hwy 3 East end	6	6	2	Highway / tourist commercial
2	Public works & Richmond Ave Industrial	13	14	5	Gravel / Mineral processing & Light Industrial
2	Airport / Industrial	40	22	11	Airport & light industrial 1
4	South Ruckles	20	118	6	Residential 1 & Rural Residential 4
5	Johnson Flats	60	131	39	Rural residential, residential 1 and small lot residential
6	SW GF	53	67	34	Rural residential, residential 1 and small lot residential
7	Donaldson / NW	31	57	9	R1, Light industrial
8	Under observation	24	34	11	R1 (but large lot, some acreage)

* For unserved lots, only selecting ones outside wetland / core Environmental DPA area

The total parcels are 449, of which 332 are constructed with on-site septic systems. **Figure 2.2** on the following page illustrates the location of these parcels.

Figure 2.2 – Sewer Service Areas



2.1 Existing and Future Densities

The existing densities in areas without community sewer are governed by the Official Community Plan (OCP) for the various land use zones. The OCP requires a minimum parcel size of 1 hectare in areas without community sewer service. The minimum parcel size changes to 0.14 hectare when community sewer service is present. This would mean that a 1-hectare parcel could be subdivided into seven 1,400 m² parcels in residential zones R1, R2, R4, and R4A. Other zoning designations such as I1, AP, TH and TC may result in smaller parcels depending on market demand.

Table 2.1 provides an approximation of the potential additional parcels that might evolve as a result of community sewer service. These approximations are purely arithmetical extensions of area and allowable density. The subdivision of parcels will depend on a host of other factors such as flood plain, market demand, etc.

Table 2.1 - Existing and Projected Densities

	Area	Predominant Zone	Area (ha)	Min Parcel Size (w/o sewer ha)	Min Parcel Size (w/ sewer ha)	Exst Parcels	Pot. Parcels w/sewer #
1	Hwy 3 East end	TC / HC	6	1	0.14	8	-
2	Public works & Richmond Ave Industrial	I1	13	N/A	N/A	19	-
3	Airport / Industrial	AP	40	N/A	N/A	33	-
4	South Ruckles	R1 / R4	20	1	0.14	124	140
5	Johnson Flats	R4 / R2	60	1	0.14	170	430
6	SW GF	R4	53	1	0.14	101	380
7	Donaldson / NW	R4A	31	1	0.14	66	220

3.0 RISK ASSESSMENT

3.1 Approach to Risk Assessment

The approach to formulating a risk assessment matrix for each area with on-site sewer systems is to provide an overview of the risk factors that relate to a range of key parameters. The key parameters are under the headings of:

- ▶ Soil Types;
- ▶ Parcel area;
- ▶ Slope;
- ▶ Depth to groundwater;
- ▶ Distance to surface water or wells.

The risk ratings are developed as numerical ratings 1 to 4. For the purpose of the assessment, a Risk of 1 is interpreted to have the lowest risk; while a Risk of 4 is interpreted to have the highest risk. Risk ratings of 2 and 3 are low medium and high medium respectively. The representation of the risk is provided on a series of mapsets prepared by Golder Associates; the maps and report are included in **Appendix A**. A brief summary of the interpretations is provided below.

	Risk Details
Soils Mapset	Fluvial/glaciofluvial (Risk 1). Most soils in study area were described as fluvial/glaciofluvial. Fluvial/glaciofluvial soils within the floodplain were assigned a Risk of 2; these soils are closer to major creeks and inferred to consist of higher fines content. Colluvium (Risk 3) Till over Bedrock and Colluvium within the floodplain (Risk 4)
Parcel Area Mapset	Parcels larger than 1 ha are a Risk 1. As per Grand Forks Bylaw No. 1606, 1999, the minimum parcel size (for subdivision purposes and most zoning) is 1 ha where there is no community sewage or water system. 0.5 – 1 ha (Risk 2) 0.14 – 0.5 ha (Risk 3) <0.14 ha (Risk 4). As per bylaw, minimum parcel size (for subdivision purpose; for most zoning) of 0.14 ha when the parcel is connected to either a community sewage or water system, but not both; or 0.07 ha when the parcel or parcels are connected to a community sewage and water system.
Slope Mapset	2 - 5% (Risk 1); 5 – 10% (Risk 2); 10 -30% (Risk 3); and <2% and >30% (Risk 4). Risk 4 accounts for potential mounding affects (<2% slope).
Depth to Groundwater Mapset	Depths greater than 10 m are a Risk; 3 – 10m are Risk 2; 1 – 3 m are Risk 3; less than 1 m are Risk 4.
Setbacks and Capture Zones	To account for surface water bodies, private water wells and larger municipal wells, a Risk of 4 was assigned to those parcels where the majority of the lot was located

	Risk Details
	<p>within a 30 m setback to surface water bodies, within a 30 m setback to private water wells and/or within the 10-year time of travel capture zone of a municipal well.</p> <p>The risks are assigned on the basis of available information on lot sizes, surficial geology, available well logs from the Ministry of Environment database, and available mapping of topography and surface water features. Figures #A through #E depict the risk ratings for each neighbourhood.</p> <p>The averages of the risk ratings for each neighbourhood are then weighted for importance as follows:</p> <ul style="list-style-type: none"> ▶ Depth to groundwater and slope are given a weighting multiplier of 1 ▶ Parcel size, setbacks and capture zones are given a weighting multiplier of 2. <p>The weighted risk ratings are then overlain, and a final feasibility risk rating calculated for each polygon.</p>

3.2 Resident Questionnaire

A questionnaire was sent out to residents of the various neighbourhoods in an effort to determine the age of the on-site systems and if they are having problems with their systems. A total of 53 responses were recorded. The questions were:

1. What is your survey number?
2. How long has there been a septic system at your house?
3. Do you know the location of your septic tank and drainfield?
4. Is your drainfield located at the front of your property or in the backyard?
5. Do you have your system inspected and maintained by a qualified technician according to a maintenance schedule?
6. Have you ever experienced any problems with blockages or overflows?
7. Have you ever seen any spongy ground or smelt odours in the field area?
8. If so, which season is worst? [Spring] [Summer] [Fall] [Winter]
9. Do you also have a well that you use for: [Drinking water]
10. Do you also have a well that you use for: [Other]

Age: 21 respondents did not know the age of their system. The other responses ranged from 2 to 30 years, with two at 8 months. The overall average age was 20 years. Most respondents said they have regular inspections (10 said no regular inspections). Four respondents said they have had problems with their systems in terms of back-ups and spongy ground in their dispersal field area. Six respondents reported having a domestic well on the same property.

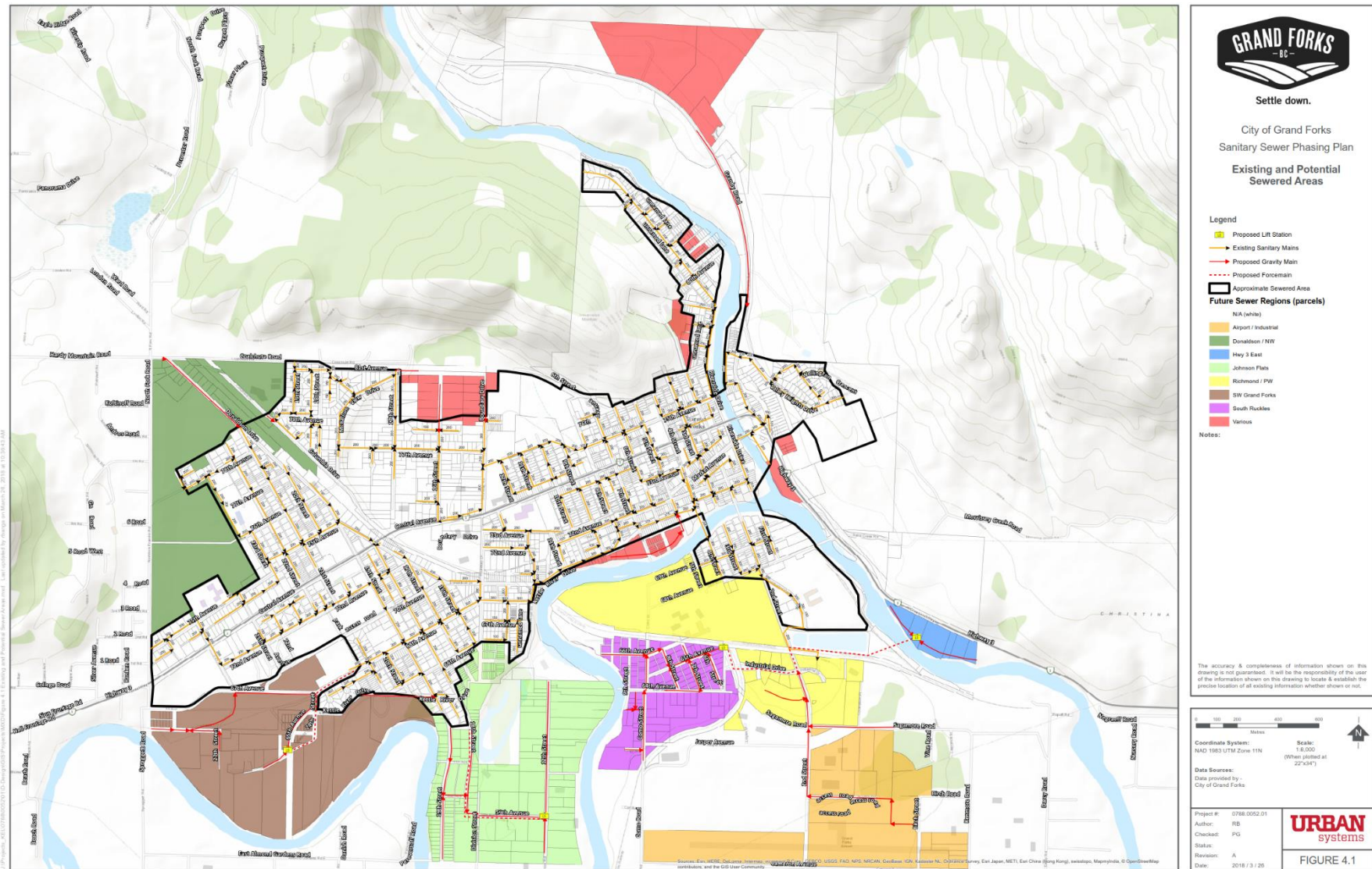
4.0 RETROFIT COMMUNITY SEWER SERVICE

Each of the seven neighbourhoods were assessed for the installation of a community collection system with a connection to the periphery of the existing sewer network. A copy of the proposed expansion of the collection system is located in **Figure 4.1** on the following page.

The topography in Grand Forks results in a requirement for a lift station in each of the seven neighbourhoods and a forcemain to deliver sewage to the existing collection system. The additional flows will, in some cases, require upgrading the existing pump stations. The impacts on existing lift stations are listed below:

- ▶ Marlex Station: impacted by flows from SW Grand Forks
- ▶ Val-Mar Station: not impacted
- ▶ Boundary Station: not impacted
- ▶ Granby Station: impacted by flows from the North area
- ▶ City Park Station; impacted by flows from Johnson Flats
- ▶ Industrial Station: impacted by flows from all neighbourhoods

Figure 4.1 – Existing and Potential Sewer Areas



The Marlex Station will require larger pumps. The Granby Station will require larger pumps, will need slope stabilization because it is in a precarious location, and will require a new forcemain river crossing as the existing aerial crossing is at risk of collapse. City Park Station will be impacted by higher flows arising from several neighbourhoods and may need an increased pump size. There has been concern over the safety and reliability of the “under-river” crossing of the Kettle River as the pipe is old and in potential danger of collapse from corrosion. The Industrial Station pumps the entire City flow and it is in need of renovations and refurbishing. All of the additional neighbourhood flows will arrive at the Industrial Station, so larger pumps will be required.

The timing of lift station upsizing will depend on how quickly community sewer is extended into the candidate neighbourhoods. For some lift stations (such as Industrial Ave.) it is the cumulative effect of connecting additional neighbourhoods that will trigger an upsizing program. The cost of upsizing existing lift stations has therefore not been included in this stage of the report.

There are two forcemains that will require replacement to reduce risk of failure. These are:

- a) The forcemain from City Park Station under the Kettle River. This could be replaced as a bored crossing under the river bed, or as a pipe bridge crossing. A detailed cost comparison should be undertaken before a method is selected.
- b) The forcemain crossing of the Granby River from the Granby Station should be replaced with a more robust pipe bridge.

4.1 Basis of Capital Cost Estimates

The capital cost estimates for retrofit sewer construction use a set of assumptions with respect to excavation and backfill, restoration, dewatering and pipe grades. Some of these key assumptions include:

- ▶ Soils will be largely suitable for trench backfill, but sand will be used for pipe bedding
- ▶ PVC sewer pipe (200 mm diameter) will be used for collection system gravity sewer and for service connection
- ▶ Manholes will be 1050 mm diameter pre-cast concrete barrels
- ▶ Service connection will be 100 mm diameter PVC pipe (average length – 10 m to property line)
- ▶ Forcemains will be 150 mm diameter PVC pressure pipe.
- ▶ Asphalt surfaces will be reinstated with 50 mm thick asphalt pavement, 3.5 m wide

Unit prices used for estimates are listed in **Appendix B**.

A summary of the estimated quantities for each of the neighbourhoods is provided in **Table 4.1** below. The areas designated as “Various” are sub-split into areas (a) through (g).

Table 4.1 - Collection System Quantities for Designated Retrofit Areas

	Area	Gravity Sewer (m)	Manholes	Force main	Services	Pump Stations	Specials
1	Hwy 3 East end	500	4	1,200	10	1	River/Rail Crossing
2	Public works & Richmond Ave Industrial	600	8	200	180	1	Hwy Crossing
3	Airport / Industrial	1,400	8	600	10	1	-
4	South Ruckles	2,300	30	540	200	1	Rail/Hwy Crossing
5	Johnson Flats	3,000	26	1,200	20	1	-
6	SW GF	2,400	20	800	10	1	-
7	Donaldson / NW	500	8	500	15	1	-

4.2 Risk Factor and Capital Cost Estimates

The Golder Associates report included in **Appendix A** provides a summary of the risk factors and the ranking of each of the neighbourhoods under consideration. The rankings, areas and number of parcels in each neighbourhood are summarized in **Table 4.2**. This table also includes the estimated capital cost for retrofit community sewer in each of the seven neighbourhoods.

Some of the neighbourhoods have already been extensively subdivided (e.g. South Ruckles). Others consist of large parcels. The retrofit sewer quantities are based on provision of community sewer on existing roads. Collection system networks for future subdivision of large parcels are not included and are assumed to be “Pay -as-You-Go” (PYG). This means that future expansion of the sewer network would become the developer’s responsibility and would simply be turned over to the City when completed.

The capital cost to service each area is divided by the number of existing parcels to arrive at a value per parcel, and by the number of hectares to arrive at the cost per hectare.

It is evident that the cost per hectare is highest when the neighbourhood is remote from the existing network and there are obstacles such as river, railway or highway crossings. The lowest per parcel and per hectare costs are in Johnson Flats and Donaldson areas. The highest are in Hwy 3 East and PW/Richmond areas.

The overall risk factors represent a blend of the Final Risk Rating Overview as determined by Golder Associates. For example, if a neighbourhood has mostly Risk 2 with some Risk 1, it is classified as Risk 2. If the neighbourhood is rated as mostly Risk 3, with some Risk 2, it is classified overall as Risk 3.

The resulting classifications are as follows:

Risk 3: Hwy 3 East

Risk 2 South Ruckles, Johnson Flats, SW Grand Forks, Donaldson

Risk 1: PW/Richmond, Airport Industrial

All of the “Various” areas are classified Risk 2. It is assumed that these areas will be PYG, since they are close to existing sewer. The exception is the north end Industrial parcel, which requires a long extension of sewer along Granby Road.

Table 4.2 – Areas, Risk Factors and \$ / Hectare

	Area	Overall Risk Factor	Area (ha)	Parcels (Dev and Undev)	Capital Cost Estimate (\$M)	Average \$ per ha
1	Hwy 3 East end	3	6	8	1.9	317,000
2	Public works & Richmond Ave Industrial	1	13	19	1.9	146,000
3	Airport / Industrial	1	40	33	1.7	42,500
4	South Ruckles	2	20	124	3.8	190,000
5	Johnson Flats	2	60	170	3.3	55,000
6	SW GF	2	53	101	2.4	45,000
7	Donaldson / NW	2	31	66	1.1	35,500

APPENDIX A

Golder Report

16 March 2018

Reference No. 1895271-001-L-Rev0

Mr. Peter Gigliotti, PEng
Urban Systems Ltd.
304 – 1353 Ellis Street
Kelowna, BC
V1Y 1Z9

SUMMARY OF THE HYDROGEOLOGICAL COMPONENT OF GROUND EFFLUENT DISPOSAL ASSESSMENT, CITY OF GRAND FORKS, BRITISH COLUMBIA

Dear Mr. Gigliotti,

Golder Associates Ltd. (Golder) is pleased to provide the results of a hydrogeological desktop study for evaluating in-ground effluent disposal systems within the City of Grand Forks (City) on behalf of Urban Systems Ltd. (USL; Client). It is our understanding that the City wishes to connect existing on-site septic systems to the municipal sanitary sewer system; and that the results of this desktop study will aid in prioritizing the existing systems for connection to the municipal sanitary sewer system.

The hydrogeological desktop study involved the classification of site-specific controlling factors (i.e., soil type, depth to groundwater, topographical slope, parcel size and horizontal setbacks) within select septic disposal regions (identified as sewer regions herein: refer to the Index Map attached) of the City (collectively referred to as the Study Area) and a subsequent qualitative risk overlay analysis using the controlling factors to categorize each sewer region in terms of its effectiveness for in-ground effluent disposal and to prioritize areas for connection to the municipal sanitary sewer system. Details of the scope of the work for this study were presented to USL in our proposal entitled “*Proposal and Cost Estimate for Hydrogeological Component of Effluent Disposal Assessment, City of Grand Forks*”, dated 26 January 26 2018.

We note that this report, including all attached figures and tables, should not be used to determine the potential risk of in-ground effluent disposal on a local (lot-by-lot) basis; rather, it is only intended to assist the City and USL in the prioritization of the select sewer regions for connection to the municipal sanitary sewer system. Additional limitations are discussed in Section 2.0 and Section 5.0.



1.0 STUDY AREA

The study was completed for the following sewer regions specified by USL:

Table 1: Sewer Regions Assessed for Hydrogeological Desk-top Study

Sewer Region	Figure Numbers (for use with Section 3.0 below)
Donaldson / NW	1A through 1F
Various*	2A through 2F and 3A through 3F
Johnson Flats	4A through 4F
SW Grand Forks	4A through 4F
South Ruckles	5A through 5F
Airport / Industrial	5A through 5F
Hwy 3 East	5A through 5F
Richmond / PW	5A through 5F

Note:

* The "Various" sewer region is comprised of clusters of parcels that are spread across the Study Area; thus, to assist Golder with prioritization of sewer regions as part of this hydrogeological desktop study, the "Various" sewer region was subdivided into five separate sub-regions: North (2A through 2F), Central, South, East and West (3A through 3F).

2.0 METHODS

A Geographic Information System (GIS) qualitative risk overlay analysis was identified as the most efficient method of meeting the study objective of categorizing the sewer regions in terms of their effectiveness for in-ground effluent disposal. The risk overlay analysis involved the following:

- Selecting a total of 559 polygons within the specified City of Grand Forks sewer regions for analysis in the qualitative risk overlay model, where each polygon was represented by a single parcel.
- Classifying suitable controlling factors (refer to Section 2.1);
- Assigning risk ratings to each controlling factor on a polygon basis (refer to Section 2.3); and
- Combining ("overlying") the risk ratings and assigning a final risk rating to each sewer region (refer to Section 3.0).

Supplemental information obtained from on-line government maps, water well logs from the BC Ministry of Environment (MOE) Water Resources Atlas, a small number of reports accessed from Agriculture and Agri-Food Canada, BC MOE websites and Golder's in-house library, were used to confirm and/or modify the risk ratings for the soil type, depth to groundwater and horizontal setback factors. Based on the results of the risk analysis, sewer regions were prioritized for connection to the municipal sanitary sewer system.

2.1 Controlling Factors

Controlling factors influencing the effectiveness of in-ground effluent disposal were based on selected parameters outlined in Oosting and Joy (2011), which represent standard hydrogeological parameters generally assessed as part of site-specific effluent disposal studies; and were limited by the size of the Study Area, as follows (in no specific order):

- The capability of a soil to infiltrate effluent; for the purposes of the risk analysis, this capability was identified by surficial geology, or soil type, evaluated to an approximate depth of five meters below surface. Soil type directly relates to the permeability of the soil, and hence, its capability of infiltrating effluent. Given the presence of the Kettle River and Granby River within the Study Area, it has been assumed that some interrelationship exists between soil type and the location of the floodplain adjacent to the Kettle and Granby Rivers (i.e., that soils within the floodplain are comprised to some degree of finer-grained materials that reduce soil permeability and infiltrating capability).
- Depth to a limiting condition (identified as a subsurface condition that limits the downward infiltration of groundwater/effluent; generally identified as fine-grained silty, clayey soils, till, bedrock or groundwater). For the purposes of the risk analysis, only depth to groundwater was considered as the limiting condition, as available soil data were not extensive and did not contain the level of detail necessary to identify soils or bedrock as limiting conditions. The depth to groundwater relates to the thickness of the unsaturated zone; effluent that infiltrates through a thicker unsaturated zone (i.e., deeper groundwater level) is less likely to result in excessive groundwater mounding or to daylight as effluent seepage down-gradient of the effluent disposal area. Higher groundwater levels, that are expected be present in areas adjacent to surface water bodies, are accounted for in the Soil Type (floodplain) controlling factor (see bullet above).
- Slope of the ground surface. A relatively steep slope may impede the ability of the effluent to infiltrate into the ground surface, resulting in more surface run-off. Where steep slopes consist of soils with a high clay or silt content, infiltration of effluent may result in erosion or slide conditions. A relatively shallow slope may increase the potential for mounding of effluent due to the inability to naturally dissipate down slope.

Other regulatory factors that influence the feasibility of effluent disposal include the availability of sufficient area to accommodate in-ground disposal fields; that effluent does not surface or daylight within a certain distance from the disposal area; and that minimum setback distances are met, as follows:

- The area available for disposal (in terms of individual parcel size) was considered to be a controlling factor influencing the effectiveness of in-ground effluent disposal. A small parcel (<0.14 hectare) may not have the area available to accommodate a septic field, particularly when other setback requirements (for example, setback from buildings, roadways, groundwater wells, etc.) must be met. Additionally, parcel size also correlates with population density, where an abundance of smaller parcels is inferred to represent a relatively more populated community, or populated area within a community.
- A horizontal setback distance from surface water bodies, private water wells and larger municipal wells was considered a controlling factor. In order to account for minimum regulatory horizontal setback distances from surface water bodies and the potential increased risks associated with effluent disposal near a surface water body (including, but not limited to: an increase in the typically shallow groundwater levels observed near surface water bodies, reduced renovation time of effluent prior to seepage into surface water body, deterioration of surface water quality, eutrophication of surface water body, etc.), a 30 m horizontal setback

distance was applied from all surface water bodies present in the Study Area. To account for minimum regulatory horizontal setback distances from groundwater wells, a 30 m horizontal setback distance was applied from all known private water wells (specifically, those registered with BC MOE). For larger high-production municipal wells, the published 10-year time of travel capture zone for each municipal well was considered a controlling factor. The time of travel capture zone indicates the time frame for contaminants (including effluent) to travel to the municipal well from a given point within the capture zone during pumping.

2.2 Sources of Information

The following data sources were used in this study:

2.2.1 Soil Type

Soil data was acquired from the Soil Information Tool map application (Ministry of Agriculture and MOE, 2018). The Soil Information Tool captures data from multiple sources, which for the Study Area included the 1:50,000 scale dataset "*Soil Survey of the Kettle River Valley in the Boundary District of British Columbia*" (SSKRV) maintained by Agriculture and Agri-Food Canada (1964 - 1976) and the coarser 1:1,000,000 scale dataset "*Soil Landscapes of Canada*" produced by Canadian Soil Information Service (CanSIS).

Soils information available on individual water well logs accessed through the BC MOE Water Resources Atlas, government reports and/or Golder's in-house investigation reports was used to augment the datasets. For each parcel the dominant soil types were selected; if two soil types fell into one parcel, the soil type that occupied a higher percentage of the parcel was used for classification.

Floodplain maps for the Kettle and Granby Rivers were sourced from BC MOE Floodplain Maps by Region (Acres International Limited, 1992). This source included a finer 1:5,000,000 scale dataset with drawing Number 90-34 Sheets 5 through 8 defining the floodplain in the Study Area.

2.2.2 Slope of Ground Surface

A 20 m resolution Digital Elevation Model (DEM) was acquired from the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, through DataBC (2018). The DEM was used to generate approximate slope, described as percentage rise over run. The average slope was then calculated for each parcel.

2.2.3 Parcel Size (available area for effluent disposal)

Parcel size was sourced directly from spatial data (shapefiles) provided to Golder by USL on 15 February 2018. Parcel area in hectares (ha) was calculated directly from the spatial information.

2.2.4 Depth to Groundwater

Depth to groundwater was derived from the BC MOE Water Resources Atlas, sourced from GeoBC; however, its original derivation was from the BC MOE – Water Protection and Sustainability Branch. For this study, water level information available from 485 water wells registered with BC MOE was used to derive a groundwater surface layer. Wells with a depth of zero were removed from the dataset. Due to the sparseness of water level data in

some areas, and overall variations in depth to groundwater, an inverse distance weighting (IDW) interpolation scheme was used to create the desired surface across each sewer region. IDW interpolation scheme minimizes errors such as those described above, but in turn, reduces the overall precision of the analysis.

In some cases, specifically, where groundwater information was not available for entire sewer regions via the sources above (i.e., Richmond/PW, Airport/Industrial, Various – Central, Various – West, and Various – South), individual water wells logs adjacent or near the Study Area were used to augment the datasets.

2.2.5 Horizontal Setback Distance and 10 Year Capture Zone

The setback distance of 30 m from a freshwater body and a domestic water supply well was derived from the *Sewerage System Regulation* (SSR, 2010) and associated Version 3 of the *Sewerage System Standard Practice Manual* (2014). Effluent discharges to ground at flows $<22.7 \text{ m}^3/\text{day}$ are authorized under the SSR. It is noted that a horizontal setback distance of 60 to 300 m from a water supply (depending on maximum daily effluent flows) is required for effluent discharge authorized under the *Municipal Wastewater Regulation* (MWR, 2016) (i.e., at flows $>22.7 \text{ m}^3/\text{day}$). Based on a review of the MOE's online discharge database, where water wells are present in a sewer region, there are no authorizations of $>22.7 \text{ m}^3/\text{day}$ inside that sewer region; thus, a 30 m setback was applied in this study, in accordance with the SSR.

The 10-year capture zone was acquired from the BC Government application iMapBC. The extents of the 10-year capture zones were cross-referenced for validation with Golder's report "Contaminant Inventory for the Grand Forks Aquifer" (Golder, 2003).

2.3 Assignment of Risk Rating for Controlling Factors

Risk ratings for each of the five controlling factors were assigned to each polygon in the model, as described in Table 2 below, and shown on the attached figures. Risk ratings were based on applicable regulatory requirements and on professional experience.

There are five figures for each sewer region (Figures #A through #F; refer to Table 1), where the first four figures in each mapset (Figures #A through #E) correspond to the risk rating of the five controlling factors, and the last figure in each mapset (Figure #F) corresponds to the final risk rating. An map showing the final risk rating of the whole Study Area is also provided and labelled as Figure 6.

Table 2: Assignment of Risk Ratings for Controlling Factors

Risk Factor	Risk Unit	Risk 1	Risk 2	Risk 3	Risk 4	Assumptions/Comments
Soil Type (Figure #A)	Soil Type	Fluvial ^a , Glaciofluvial ^a	Fluvial, Glaciofluvial Within Floodplain	Colluvial	Till over Bedrock and Colluvial Within Floodplain	Soil types ranged from (inferred low to non-permeable) till over bedrock, (inferred moderately permeable) colluvial deposits, and (inferred permeable) fluvial/glaciofluvial sands and gravels. Soil type was assigned a risk rating based on its inferred permeability (infiltration capability), with the most permeable (highest infiltration capacity) as Risk 1, and least permeable (lowest infiltration capacity) as Risk 4. A similar soil type within the floodplain was assigned a higher risk rating due to the higher probability of underlying silts and clay deposits and general low permeability characteristics of soil within the floodplain.
Depth to Groundwater (Figure #B)	Metres Below Ground	>10	3 to 10	1 to 3	0 to <1	A lower risk rating was assigned to deeper groundwater, while a higher risk rating was assigned to shallower groundwater.
Average Slope (Figure #C)	Percent	0 ^b to 5	5 to 10	10 to 30	>30	A lower risk rating was assigned to a shallower slope, while a higher risk rating was assigned to steeper slope.
Parcel Size (Figure #D)	Hectares	>1	0.5 to 1	0.14 to 0.5	<0.14	A lower risk rating was assigned to larger parcel sizes, while a higher risk rating was assigned to smaller parcel sizes. As per the City of Grand Forks Bylaw No. 1606, 1999 (for subdivision purposes; for most zoning), a minimum parcel size of 0.14 hectares is required when the parcel is connected to either a community sewage or water system, but not both; and a minimum parcel size of 0.07 ha is required when the parcel is connected to a community sewage and water system.
Horizontal Setback ^c and Capture Zones (Figure #E)	n/a	Outside of Setback and Capture Zone	n/a	n/a	Inside of Setback and Capture Zone	The lowest risk rating (Risk 1) was assigned to parcels outside of the setback requirements and capture zones, while the highest risk rating (Risk 4) was assigned to parcels within the setback requirements and capture zones. Where setbacks/capture zones intersected parcels, the risk rating was assigned based on the location of the majority of the parcel.

Notes:

- ^a While all fluvial and glaciofluvial deposits have been assigned a ranking of Risk 1, in some cases, these deposits may be too permeable for sufficient renovation of effluent, which may potentially have a negative impact on the water quality of receiving water bodies. For the purposes of this large-scale study, differentiation has not been made between permeable deposits with sufficient renovation and those with insufficient renovation.
- ^b A very flat topographical slope (i.e., <2%) may, in some cases, correlate with a “flat” groundwater surface, potentially resulting in excessive groundwater mounding due to a low hydraulic gradient. For the purposes of this study, higher risk ratings for “flat” groundwater surfaces have not been made, and all slopes less than 5% were assigned a ranking value of Risk 1.
- ^c For the purposes of this study, setback requirements have only been applied to groundwater wells registered with the BC MOE. It was beyond the scope of this study to confirm whether registered wells within the Study Area are operational or abandoned/decommissioned, and/or if other wells not registered with the Province exist within the Study Area.

2.4 Assignment of Final Feasibility Risk Rating

2.4.1 Polygons (within Sewer Regions)

For each polygon, risk ratings for soil type, depth to groundwater and average slope were given a weighting of 1; while the risk rating for parcel size, setback requirements and capture zones was given a weighting of 2. Weightings were determined during the model calibration process and were based on available information for the Study Area, and on professional knowledge, resulting in a higher weighting being assigned to parcel size, setback requirements and capture zones. The weighted risk ratings were overlain, and a final feasibility risk rating was then calculated for each polygon.

2.4.2 Sewer Regions

For the purposes of assigning a final risk rating to each sewer region, the average weighted risk rating for each sewer region was calculated, and a final feasibility risk rating was then determined, as summarized in Table 3. Final feasibility risk ratings were assigned a Risk 1 through Risk 4, corresponding to an increase in risk associated with the effectiveness of in-ground effluent disposal, based on the five controlling factors listed above. Risk 1 corresponds to an area inferred to pose the lowest risk associated with the effectiveness of in-ground effluent disposal, while Risk 4 corresponds to an area inferred to pose the highest risk associated with the effectiveness of in-ground effluent disposal.

Table 3: Final Risk Ratings for Sewer Regions

Average Weighted Risk Rating	Final Feasibility Risk Rating
1.0 - <2.0	Risk 1
2.0 - <3.0	Risk 2
3.0 – 3.4	Risk 3
3.5 – 4.0	Risk 4

3.0 RESULTS OF QUALITATIVE RISK ANALYSIS

The final feasibility risk ratings for each polygon are shown on all attached figures with the suffix “E”.

The final feasibility risk ratings for each sewer region are summarized in Table 4. The sewer regions have been arranged such that the “*Average Weighted Risk Rating*” is shown from lowest (at the top of the table) to highest (at the bottom of the table). General comments regarding the final risk ratings are also provided.

Note again that each sewer region has been assigned a single value for final feasibility risk rating, where the single value is the average of the polygons within the sewer region. Therefore, each sewer region will be graphically shown as comprising polygons of more than one final feasibility risk rating.

Table 4: Results of Qualitative Overlay Risk Analysis

Sewer Region and Corresponding Figure		Average Risk Rating for each Controlling Factors					Average Weighted Risk Rating	Final Feasibility Risk Rating	Comments
		Soil Type	Depth to Groundwater	Slope	Parcel Size	Setback and Capture Zone			
Airport/ Industrial	5F	1.0	1.4	1.1	1.7	1.0	1.3	Risk 1	Minimal well data. Mostly Risk 1 with minor Risk 2 areas.
Various - West	3F	1.0	1.9	1.0	3.0	1.0	1.7	Risk 1	No well data within sewer region. Mostly Risk 1 with some intermediate risk (Risk 2-3) areas relating to small parcels and shallow groundwater recorded from surrounding wells.
Richmond/ PW	5F	1.9	1.5	1.5	2.8	2.3	1.9	Risk 1	Minimal well data. No well data in Northern section of this region. Mostly Risk 1 with some Risk 2 areas and minor Risk 3 areas due to small parcel sizes.
Various – North	2F	4.0	2.3	3.0	1.0	1.0	1.9	Risk 1	Minimal well data. Mostly Risk 1 with high risk till over bedrock (Risk 4), steep sloping topography (Risk 3) and intermediate depth to groundwater/ wells drilled into bedrock (Risk 2-3). Spring noted in centre of parcel by USL.

Sewer Region and Corresponding Figure		Average Risk Rating for each Controlling Factors					Average Weighted Risk Rating	Final Feasibility Risk Rating	Comments
		Soil Type	Depth to Groundwater	Slope	Parcel Size	Setback and Capture Zone			
South Ruckles	5F	1.9	1.0	1.2	3.6	1.1	1.9	Risk 1	Minimal depth to groundwater data. Mostly Risk 2 with some Risk 1 and minimal Risk 3 areas (small parcel size). Some areas near river within setback zone are higher risk and have steeper slope.
Hwy 3 East	5F	2.0	2.0	1.8	2.0	2.5	2.1	Risk 2	Mostly Risk 2 with some Risk 1 and Risk 3 areas. High risk areas (Risk 4) within river and well setback distance.
Donaldson/ NW	1F	1.0	1.0	1.7	2.7	2.9	2.1	Risk 2	Mostly Risk 2 with some Risk 1 and minimal high Risk 3-4 areas. Central portion of this region is within the 10-year well capture zone.
Various - Central	3F	2.1	2.0	1.5	3.8	1.0	2.2	Risk 2	No well data within sewer region. Mostly low to intermediate (Risk 1-2) areas. Minimal high risk soil type (Risk 3-4) of colluvium within floodplain and some high risk (Risk 4) small parcels.

Sewer Region and Corresponding Figure		Average Risk Rating for each Controlling Factors					Average Weighted Risk Rating	Final Feasibility Risk Rating	Comments
		Soil Type	Depth to Groundwater	Slope	Parcel Size	Setback and Capture Zone			
Johnson Flats	4F	1.5	2.0	1.3	3.4	1.9	2.2	Risk 2	Mostly Risk 2 with some low Risk 1 and high Risk 3 areas. This region has a broad range of parcel sizes and a large portion of this region is within the floodplain. Some areas are high Risk 4 within the 10-year well capture zone and well setback distance.
Various – East	3F	1.1	1.1	3.4	3.5	1.4	2.2	Risk 2	Minimal well data within sewer region. High (Risk 4) area within setback distance from the Kettle/Granby Rivers. High risk (Risk 3-4) steep slope and high risk small parcel sizes.
Various - South	3F	1.7	2.0	1.7	3.8	1.5	2.3	Risk 2	No well data within sewer region. High (Risk 4) risk for small parcel sizes and some portions of this region within the setback distance from the Kettle River.
SW Grand Forks	4F	1.2	1.8	1.1	3.2	4.0	2.6	Risk 2	Mostly Risk 2, with some Risk 3 areas including majority of region within floodplain. High Risk 4 as region is entirely within 10-year well capture zone.

4.0 DISCUSSION OF QUALITATIVE RISK ANALYSIS

4.1 Sewer Regions

4.1.1 Risk 4

There are no sewer regions that are considered a Risk 4. However, note that some smaller areas within individual sewer regions have individual parcel risk rankings of 4.

4.1.2 High Risk Areas

Based on the qualitative risk analysis, the sewer regions of SW Grand Forks (Figure 4F), Various – South (Figure 3F), Various – East (Figure 3F), Johnson Flats (Figure 4F) and Various – Central (Figure 3F) appear to pose the highest risk with respect to the effectiveness of in-ground effluent disposal. This is mainly due to the higher risk ratings associated with a small parcel size, location within the setback distance requirements and/or capture zones, as well as flooding and high groundwater table as a result of proximity to the Kettle and/or Granby Rivers.

4.1.3 Lower Risk Areas

Based on the qualitative risk analysis, the sewer regions of Airport/Industrial (Figure 5F), Various – West (Figure 3F), Richmond/PW (Figure 5F), Various – North (Figure 2F), South Ruckles (Figure 5F), Hwy 3 East (Figure 5F), Donaldson/NW (Figure 1F) and Various – Central (Figure 3F), appear to pose a low (Risk 1) to intermediate (Risk 2) risk with respect to the effectiveness of in-ground effluent disposal.

Where numerous groundwater wells are concentrated within one area of the sewer region (i.e., Donaldson/NW, South Ruckles and Richmond/ PW), the risk of impacting groundwater supply sources from the in-ground disposal of effluent is likely to increase, particularly in established communities where disposal systems may be older and/or in developed communities where parcel sizing may be smaller.

4.2 Corroboration of Desktop Study

Should the City wish to corroborate the results of this qualitative risk analysis, additional assessment may be conducted, including subsurface investigations to confirm local soil and groundwater conditions; and long-term groundwater and surface water monitoring programs within select sewer regions, particularly those in proximity to clustered water wells or aquatic receiving environments.

Additionally, the City may wish to identify existing and operational/abandoned/decommissioned private water wells within each sewer region. This study only accounted for water wells registered with the Province. Additional (non-registered) water wells may exist, and their presence may result in an increase to the risk ratings in that sewer region.

We understand that the City has completed a preliminary survey to identify individual septic disposal system issues within the City boundary as well as to assess which properties utilize both a septic field and water well. The results of the survey may be superimposed onto the final risk rating figures to assist in prioritizing sewer regions.

The maps and risk ratings generated as part of this study should not be relied upon for prioritizing individual parcels for connection to municipal sanitary system, but should rather be used to assist in the prioritizing of the larger sewer regions.

5.0 STANDARD LIMITATIONS

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6.0 CLOSURE

We trust this report provides you with the information you require at this time. Should you have any questions or require additional information or clarification, please do not hesitate to contact the undersigned.

Yours very truly,

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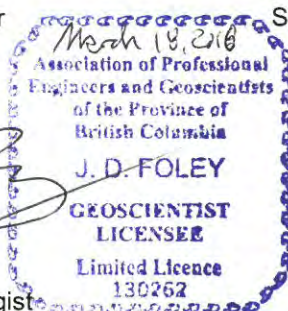
Danielle Wiesner, EIT
Junior Environmental Engineer

March 16/18
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PROFESSIONAL
GEOSCIENTIST
P. ATHANASIOPOULOS
35948
BRITISH
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Pana Athanasiopoulos, MSc, PGeo
Senior Hydrogeologist

J. D. Foley

Jacqueline Foley, MSc, Geol
Associate, Senior Hydrogeologist



DW/PA/JF/asd

Attachments: Figures Index Map

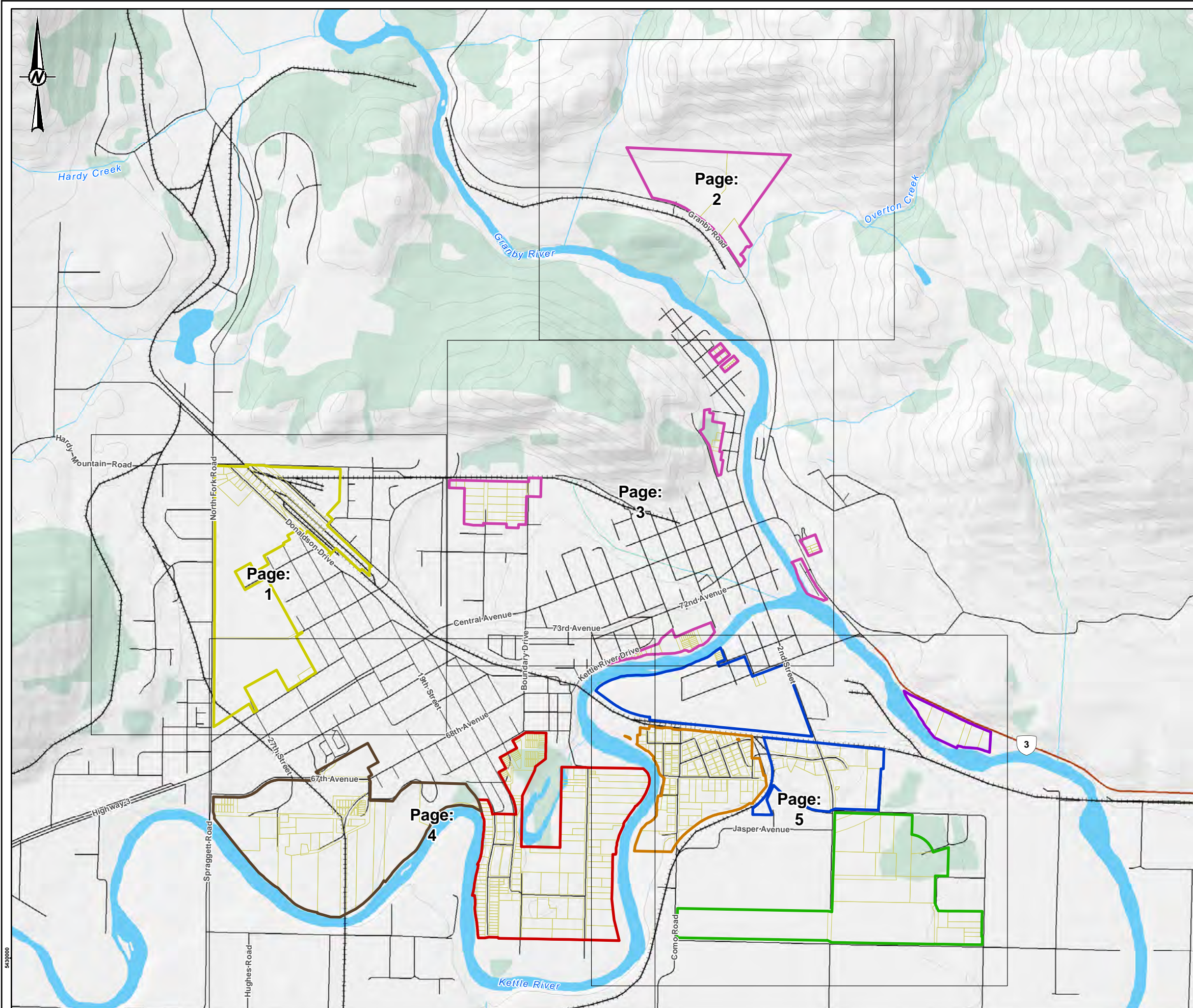
1A through 1F	Donaldson / NW
2A through 2F	Various*
3A through 3F	Various*
4A through 4F	Johnson Flats
4A through 4F	SW Grand Forks
5A through 5F	South Ruckles
5A through 5F	Airport / Industrial
5A through 5F	Hwy 3 East
5A through 5F	Richmond / PW
6	Final Risk Rating Overview

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7.0 REFERENCES

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LEGEND

- PARCEL
- SEWER REGION
 - AIRPORT / INDUSTRIAL
 - DONALDSON / NW
 - HWY 3 EAST
 - JOHNSON FLATS
 - RICHMOND / PW
 - SW GRAND FORKS
 - SOUTH RUCKLES
 - VARIOUS
- BASE DATA
 - HIGHWAY
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION



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INDEX MAP

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LEGEND

PARCEL

SEWER REGION

DONALDSON / NW

RISK RATING FOR SOIL

RISK 1: FLUVIAL / GLACIOFLUVIAL

RISK 2: FLUVIAL / GLACIOFLUVIAL WITHIN FLOODPLAIN

RISK 3: COLLUVIUM

RISK 4: TILL / COLLUVIUM OVER BEDROCK AND COLLUVIUM WITHIN FLOODPLAIN

BASE DATA

ROAD

RAILWAY

CONTOUR (20m)

VEGETATION

KEY MAP

090180

1:6,000METRES

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RISK RATING FOR SOIL
DONALDSON / NW

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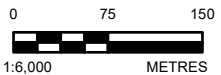
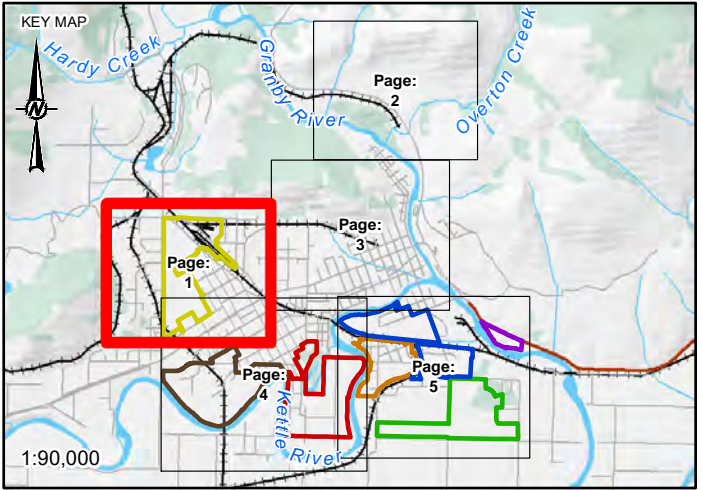
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- LEGEND**
- GROUNDWATER WELL
 - PARCEL
 - SEWER REGION**
 - DONALDSON / NW
 - RISK RATING FOR DEPTH TO GROUNDWATER**
 - RISK 1: > 10 m
 - RISK 2: 3 - 10 m
 - RISK 3: 1 - 3 m
 - RISK 4: < 1 m
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - VEGETATION



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DONALDSON / NW**

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APPROVED	JF	

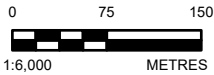
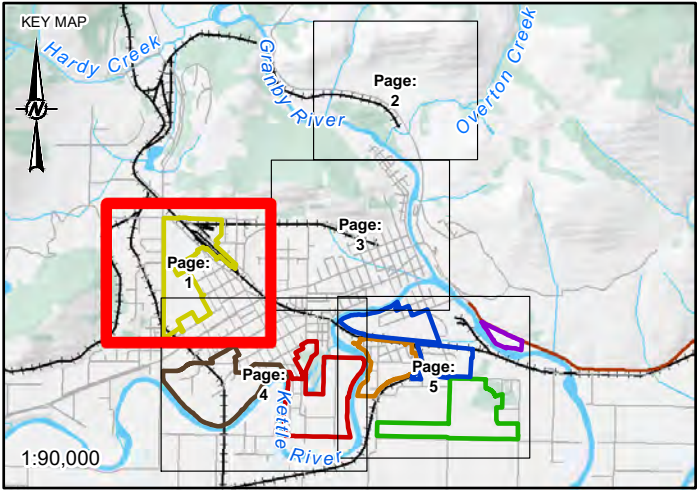


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- PARCEL
 - SEWER REGION**
 - DONALDSON / NW
 - RISK RATING FOR SLOPE**
 - RISK 1: < 5 %
 - RISK 2: 5 - 10 %
 - RISK 3: 10 - 30 %
 - RISK 4: > 30 %
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - VEGETATION



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RISK RATING FOR SLOPE

DONALDSON / NW

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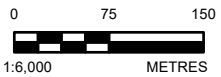
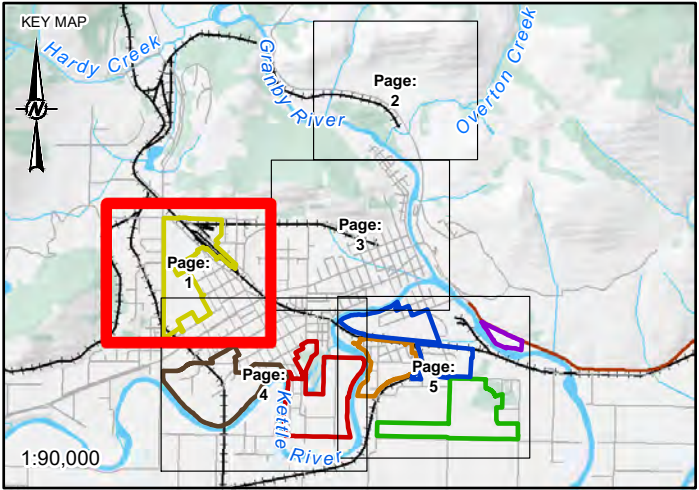
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- LEGEND**
- PARCEL
 - SEWER REGION**
 - DONALDSON / NW
 - RISK RATING FOR PARCEL SIZE**
 - RISK 1: > 1 ha
 - RISK 2: 0.5 - 1 ha
 - RISK 3: 0.14 - 0.5 ha
 - RISK 4: < 0.14 ha
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - VEGETATION



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TITLE

RISK RATING FOR PARCEL SIZE

DONALDSON / NW

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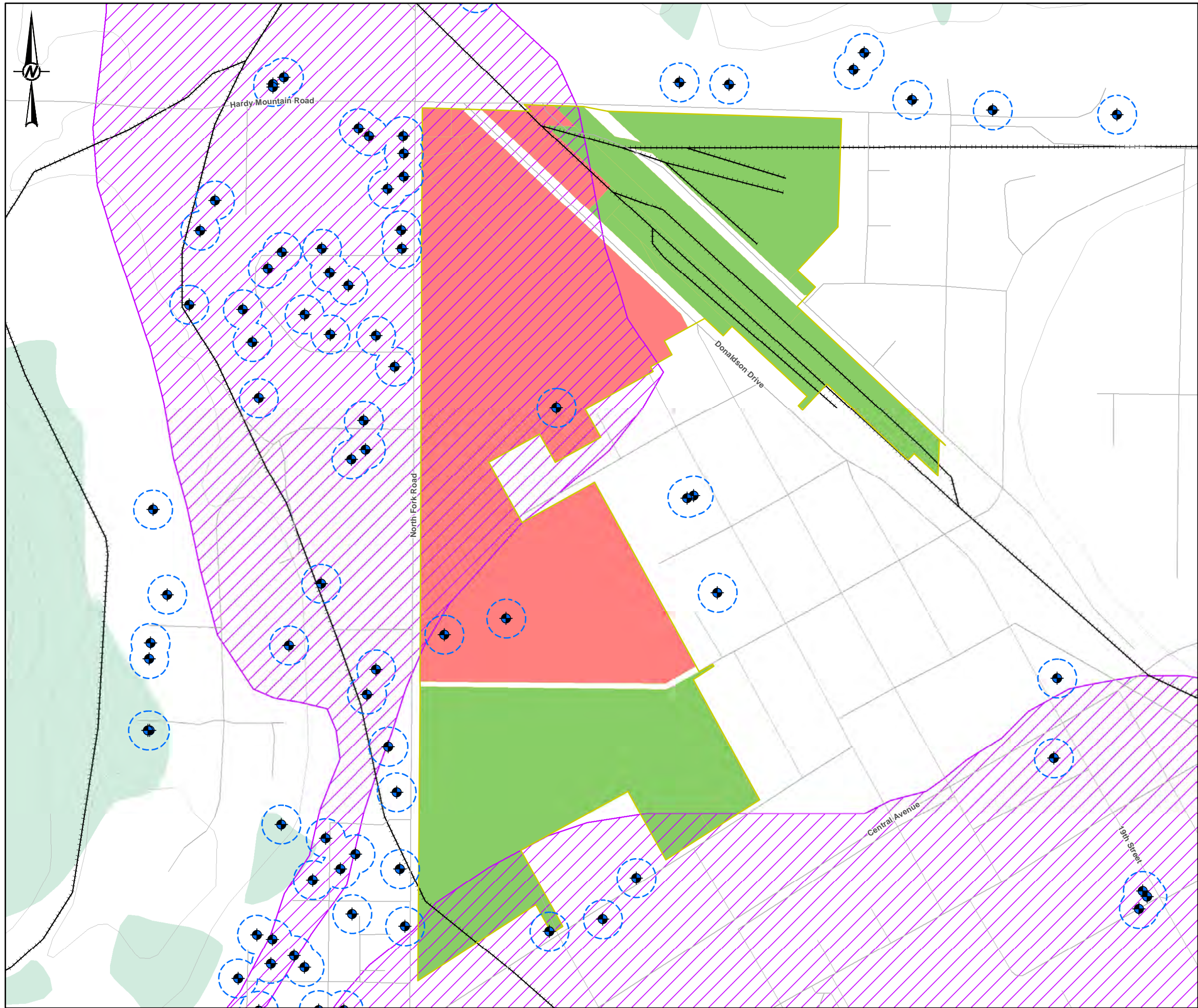


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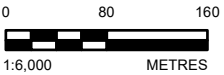
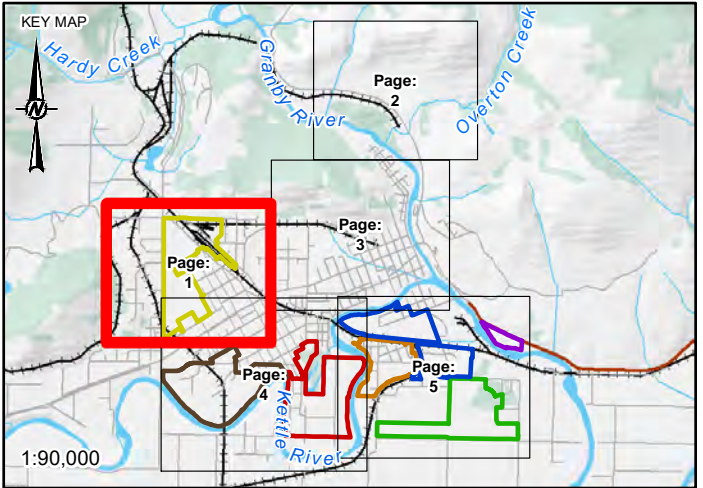
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- LEGEND**
- GROUNDWATER WELL
 - PARCEL
 - SEWER REGION**
 - DONALDSON / NW
 - RISK RATING FOR SURFACE WATER SETBACKS AND WELL CAPTURE ZONES**
 - RISK 1
 - RISK 4
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - VEGETATION
 - HORIZONTAL SETBACK FOR SURFACE WATER BODIES/WATER SUPPLY WELLS
 - WELL CAPTURE ZONE (10 YEAR)



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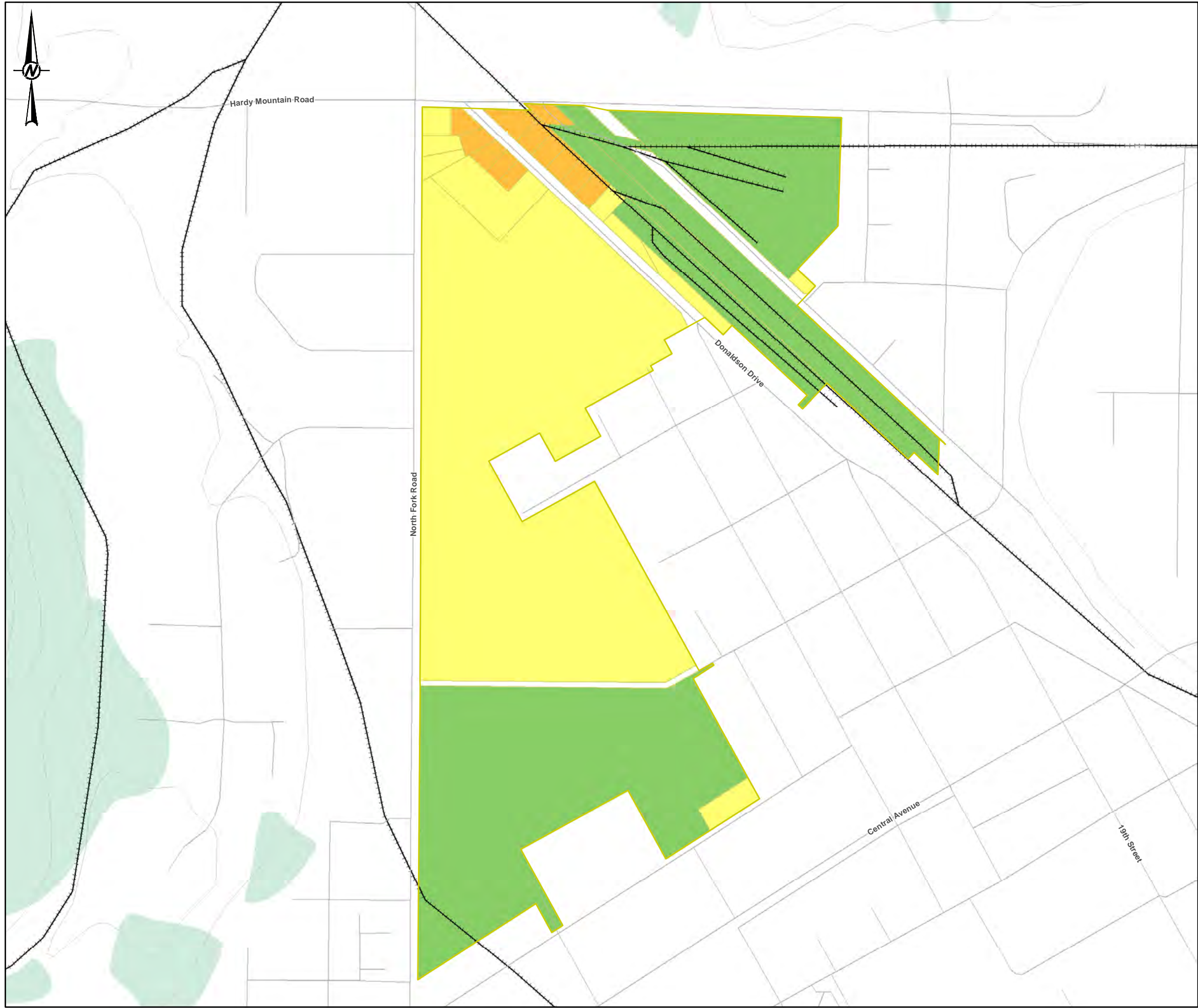
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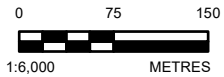
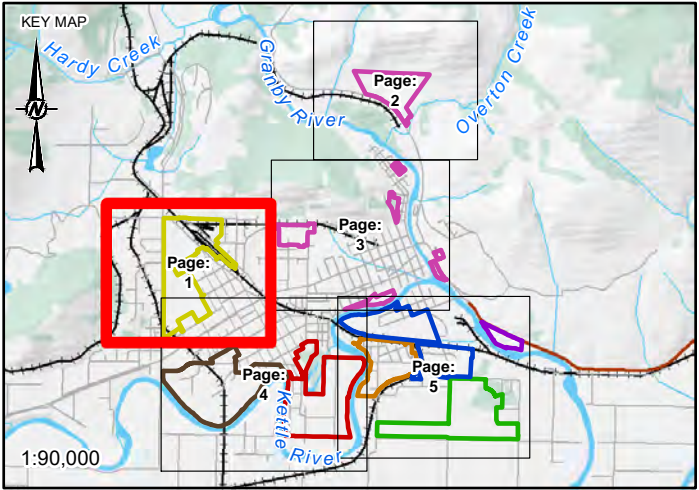
PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 14
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- LEGEND**
- PARCEL
 - SEWER REGION**
 - DONALDSON / NW
 - FINAL RISK RATING**
 - RISK 1
 - RISK 2
 - RISK 3
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - VEGETATION



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TITLE

FINAL RISK RATING

DONALDSON / NW

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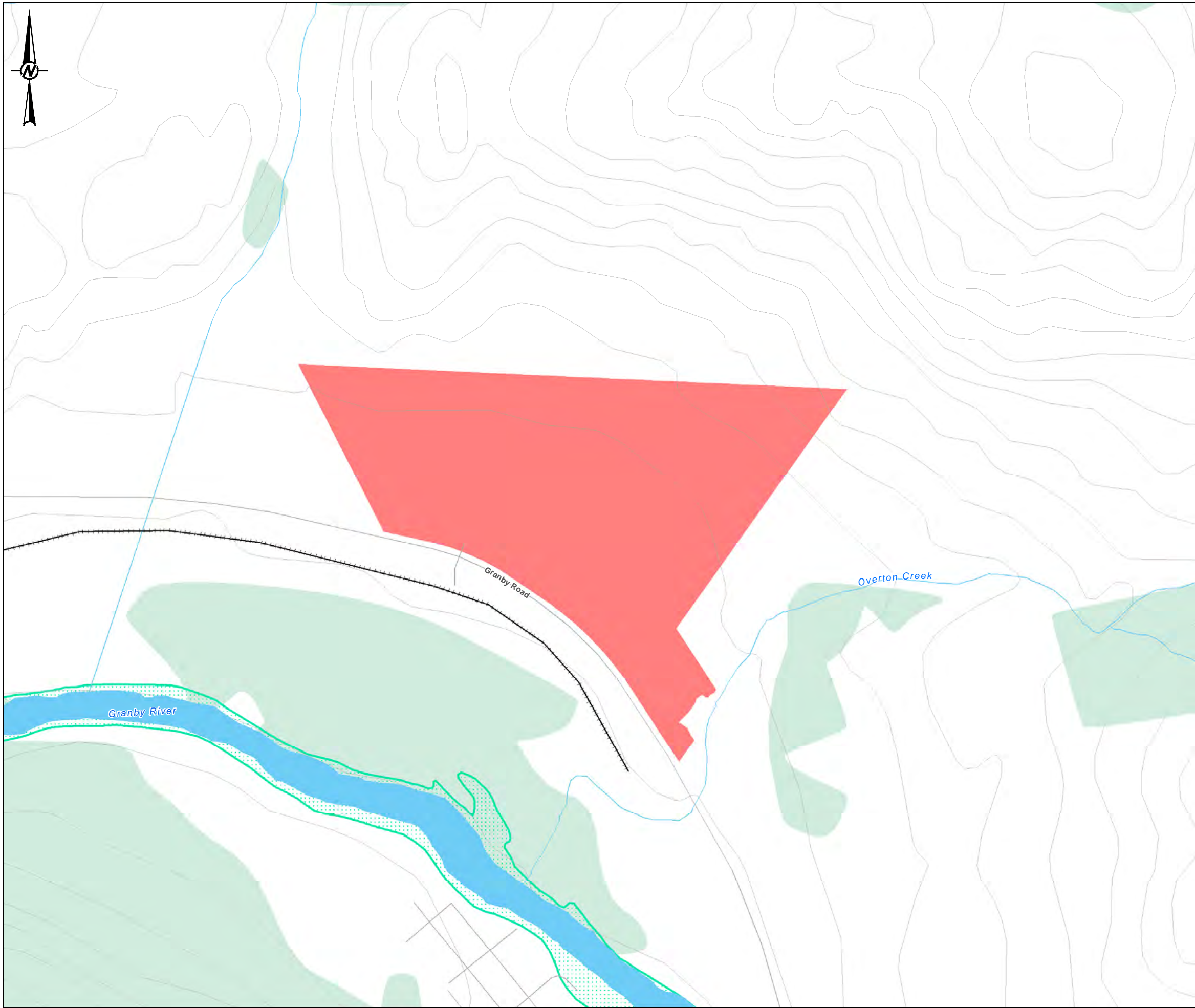


PROJECT NO.	CONTROL	REV.	FIGURE
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LEGEND
RISK RATING FOR SOIL
RISK 1: FLUVIAL / GLACIOFLUVIAL
RISK 2: FLUVIAL / GLACIOFLUVIAL WITHIN FLOODPLAIN
RISK 3: COLLUVIUM
RISK 4: TILL / COLLUVIUM OVER BEDROCK AND COLLUVIUM WITHIN FLOODPLAIN
BASE DATA
ROAD
RAILWAY
CONTOUR (20m)
WATERCOURSE
VEGETATION
FLOODPLAIN

KEY MAP
Hardy Creek
Granby River
Overton Creek
Kettle River
Page: 1
Page: 2
Page: 3
Page: 4
Page: 5
1:90,000
0 90 180
1:6,000 METRES

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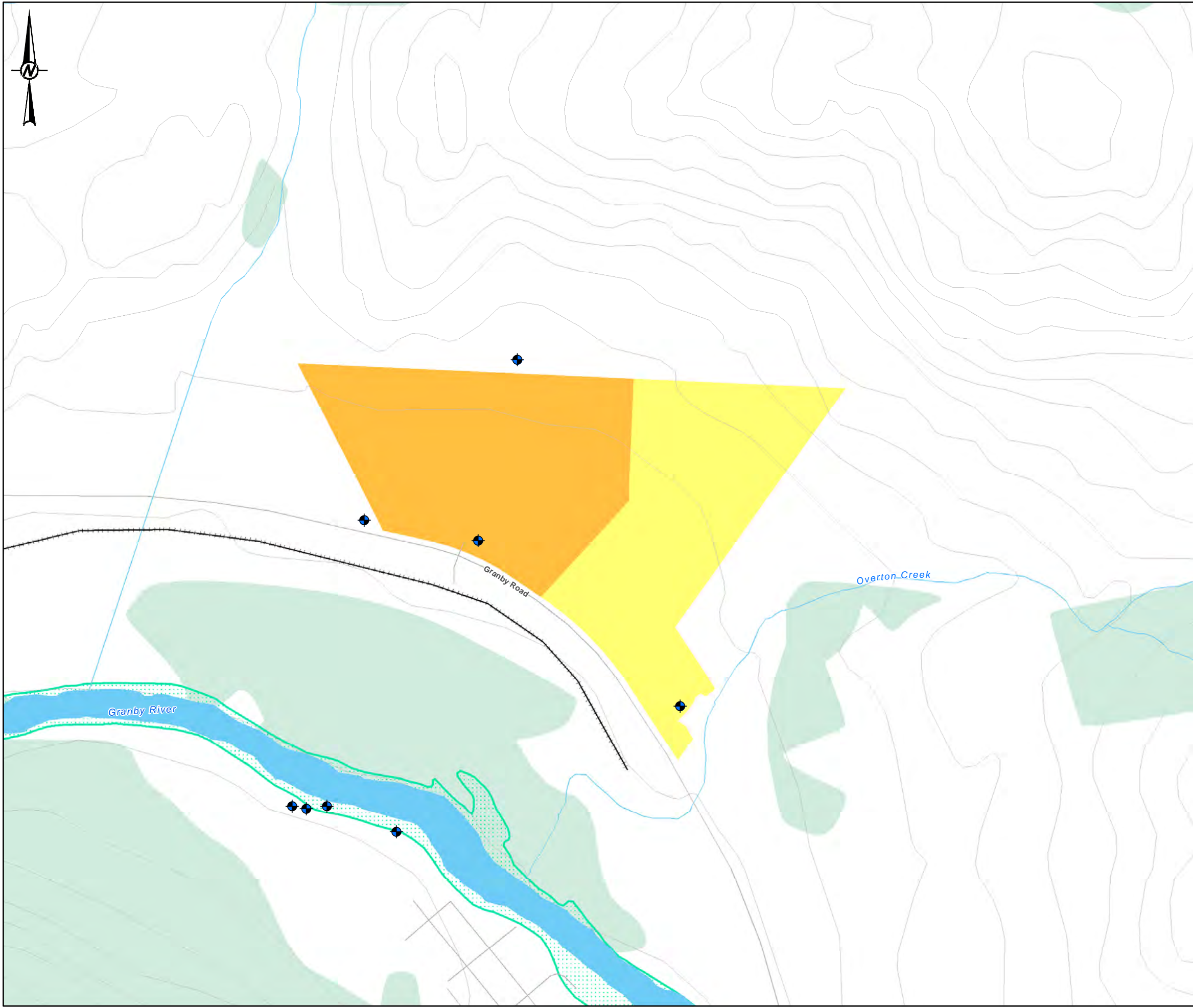
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VARIOUS - NORTH

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
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PROJECT NO.	CONTROL	REV.	FIGURE
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LEGEND
 GROUNDWATER WELL
RISK RATING FOR DEPTH TO GROUNDWATER
 RISK 1: > 10 m
 RISK 2: 3 - 10 m
 RISK 3: 1 - 3 m
 RISK 4: < 1 m
BASE DATA
 ROAD
 RAILWAY
 CONTOUR (20m)
 WATERCOURSE
 VEGETATION
 FLOODPLAIN

KEY MAP

REFERENCE(S)
1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.
2. CONTOURS, ROADS, VEGETATION, WATERCOURSES, AND WATERBODIES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

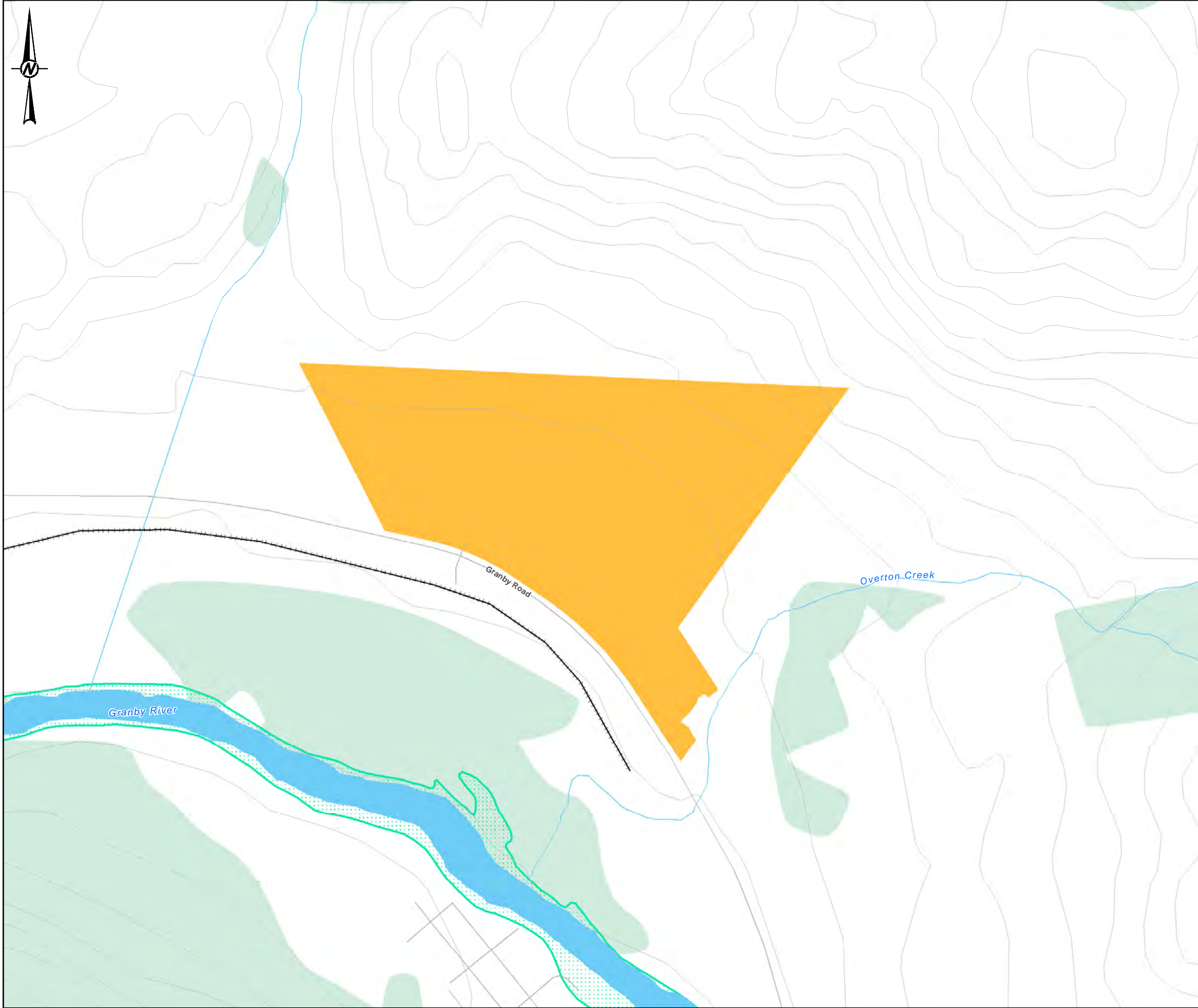
TITLE
RISK RATING FOR DEPTH TO GROUNDWATER
VARIOUS - NORTH

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 56 of 24

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 20mm

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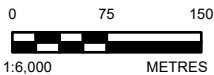
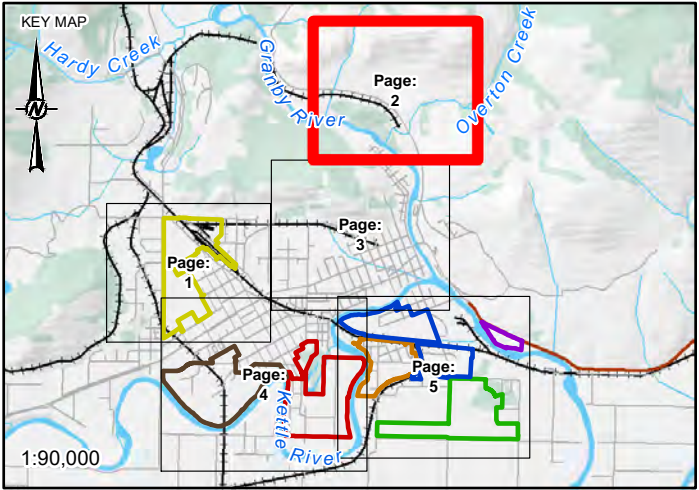
LEGEND

RISK RATING FOR SLOPE

- RISK 1: < 5 %
- RISK 2: 5 - 10 %
- RISK 3: 10 - 30 %
- RISK 4: > 30 %

BASE DATA

- ROAD
- RAILWAY
- CONTOUR (20m)
- WATERCOURSE
- VEGETATION
- FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

2. CONTOURS, ROADS, VEGETATION, WATERCOURSES, AND WATERBODIES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

CLIENT

URBAN SYSTEM LTD.

PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

RISK RATING FOR SLOPE

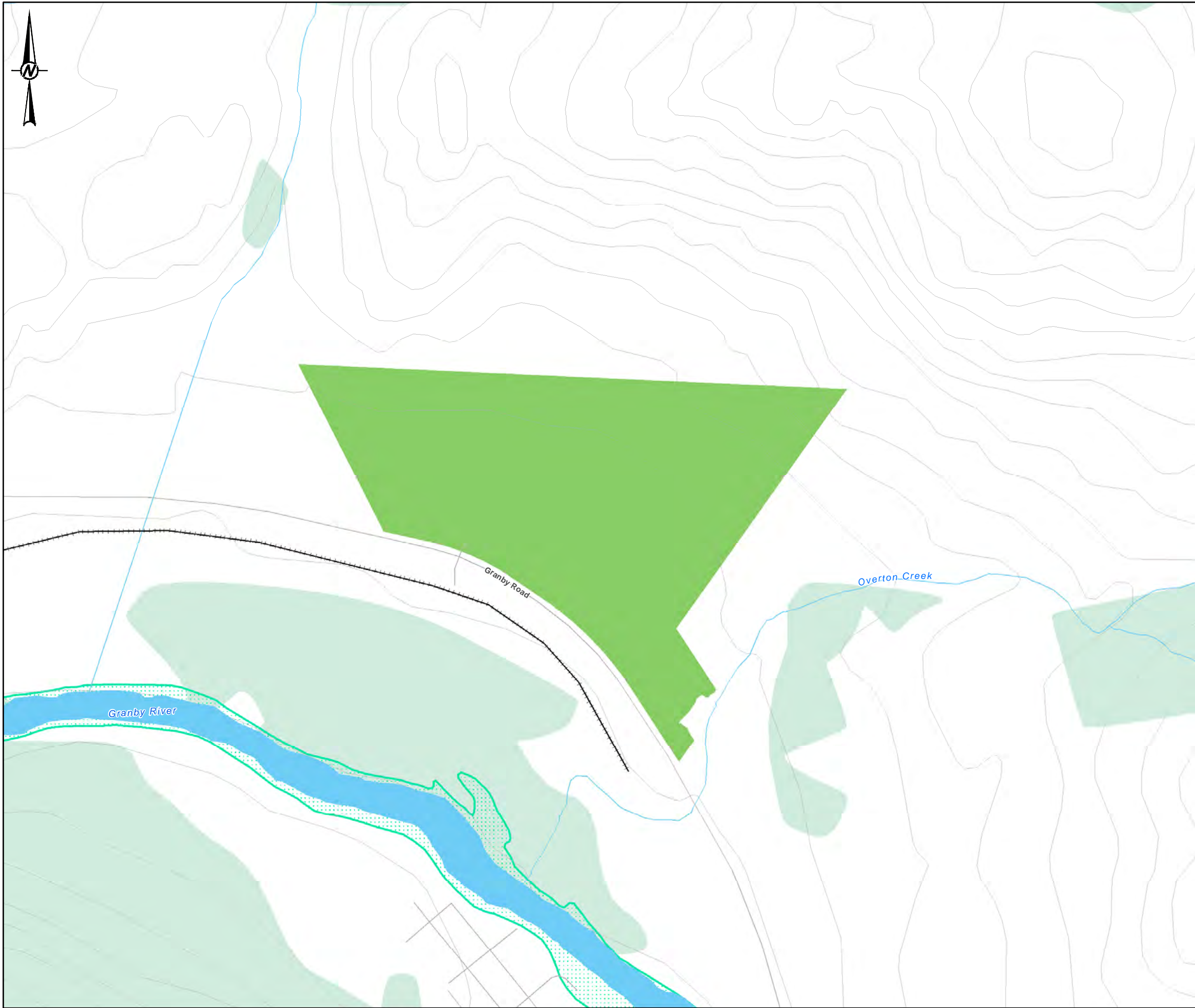
VARIOUS - NORTH

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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LEGEND
RISK RATING FOR PARCEL SIZE
RISK 1: > 1 ha
RISK 2: 0.5 - 1 ha
RISK 3: 0.14 - 0.5 ha
RISK 4: < 0.14 ha
BASE DATA
ROAD
RAILWAY
CONTOUR (20m)
WATERCOURSE
VEGETATION
FLOODPLAIN

KEY MAP

1:90,000

REFERENCE(S)
1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.
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PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

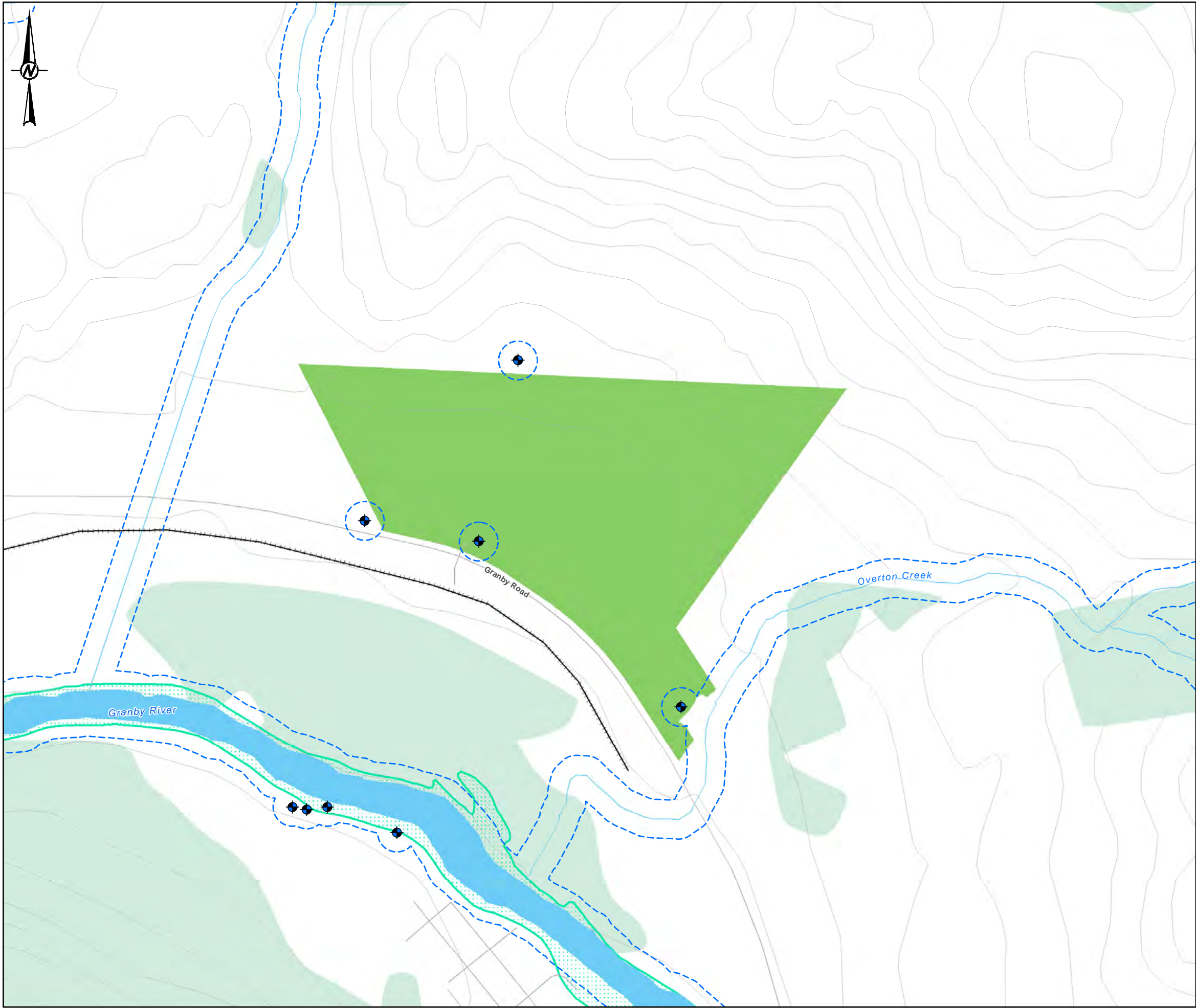
TITLE
**RISK RATING FOR PARCEL SIZE
VARIOUS - NORTH**

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 58 of 29

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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LEGEND

GROUNDWATER WELL

RISK RATING FOR SURFACE WATER SETBACKS AND WELL CAPTURE ZONES

RISK 1

RISK 4

BASE DATA

ROAD

RAILWAY

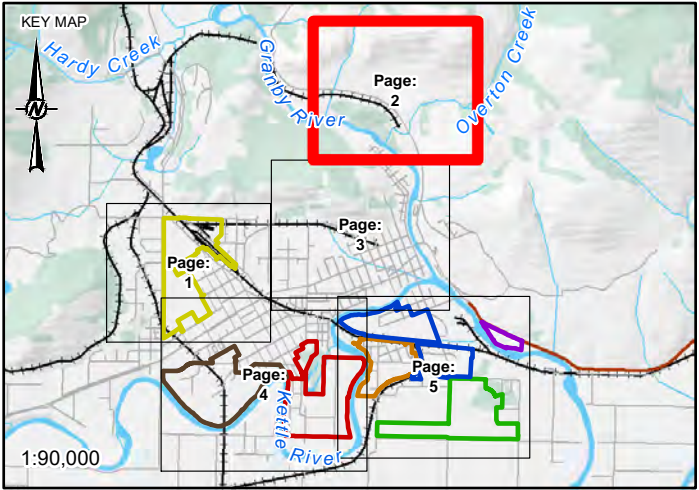
CONTOUR (20m)

WATERCOURSE

VEGETATION

HORIZONTAL SETBACK FOR SURFACE WATER BODIES/WATER SUPPLY WELLS

FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

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PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

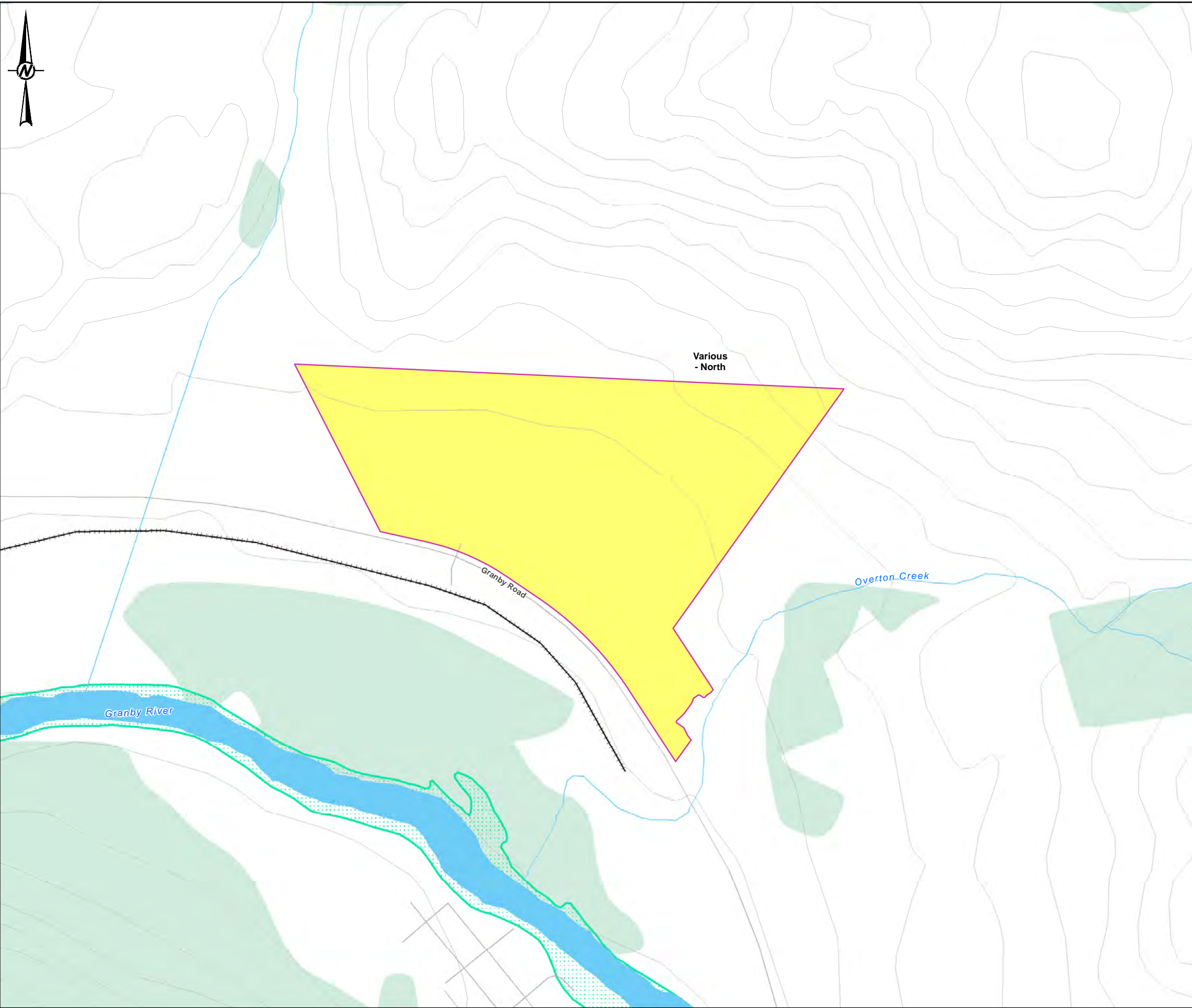
RISK RATING FOR SURFACE WATER/WATER WELL SETBACKS AND WELL CAPTURE ZONES VARIOUS - NORTH

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

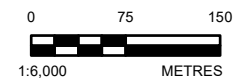
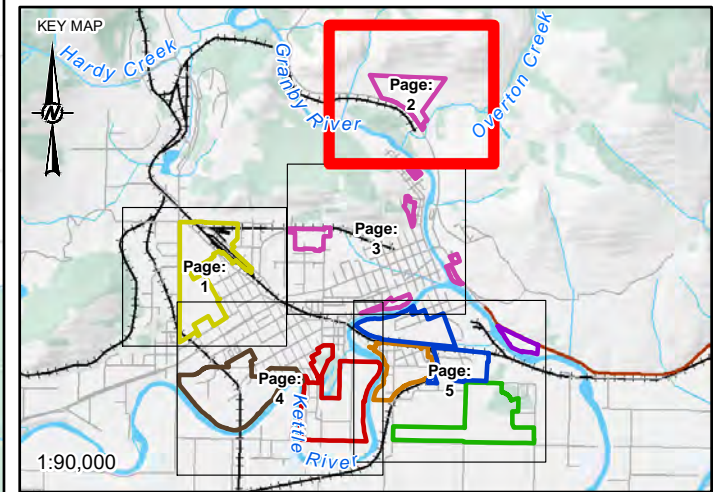


IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- SEWER REGION**
- VARIOUS
- FINAL RISK RATING**
- RISK 2
- BASE DATA**
- ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

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CLIENT

URBAN SYSTEM LTD.

PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

FINAL RISK RATING

VARIOUS - NORTH

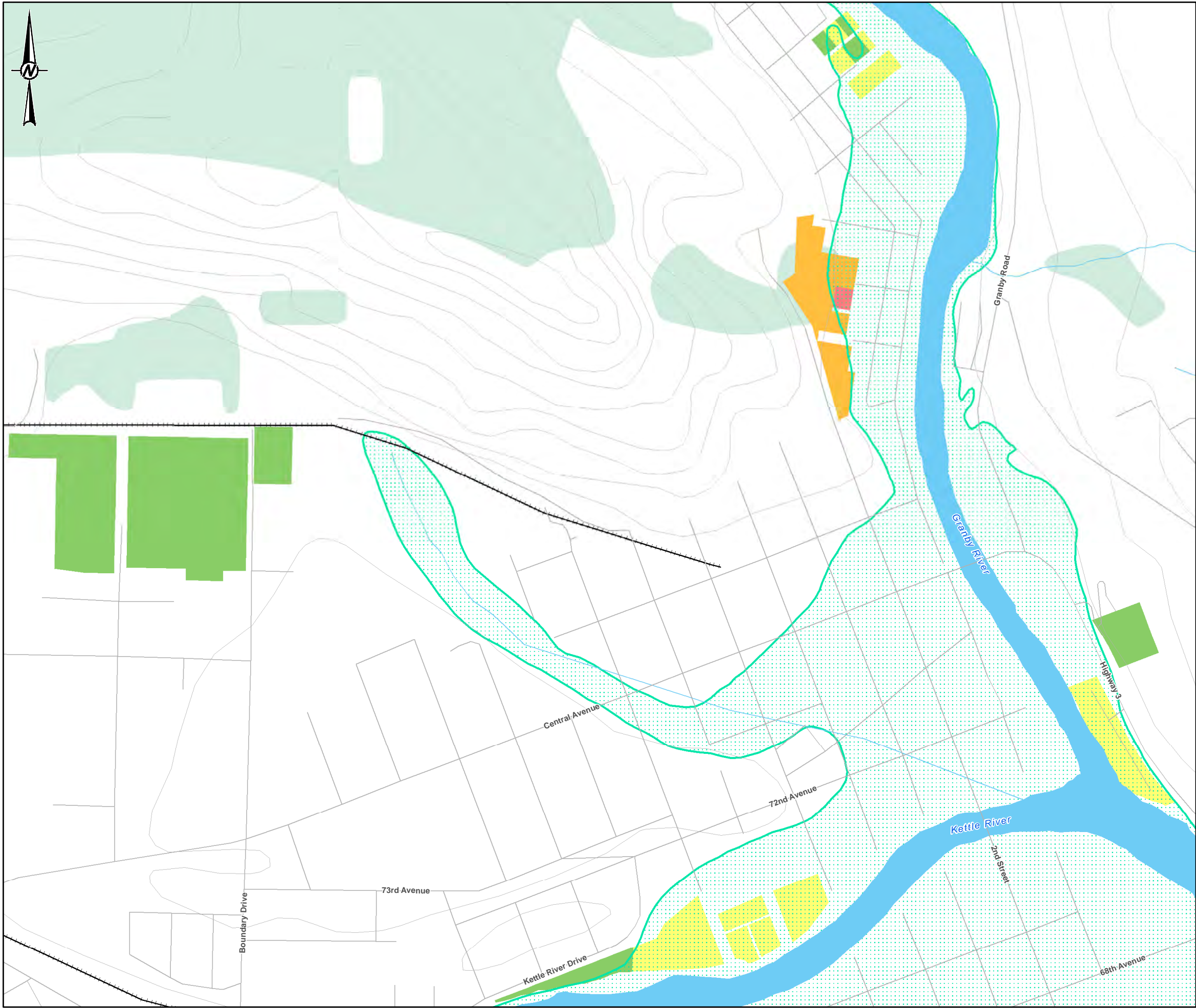
CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 60 of 24

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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LEGEND
RISK RATING FOR SOIL
RISK 1: FLUVIAL / GLACIOFLUVIAL
RISK 2: FLUVIAL / GLACIOFLUVIAL WITHIN FLOODPLAIN
RISK 3: COLLUVIUM
RISK 4: TILL / COLLUVIUM OVER BEDROCK AND COLLUVIUM WITHIN FLOODPLAIN
BASE DATA
ROAD
RAILWAY
CONTOUR (20m)
WATERCOURSE
VEGETATION
FLOODPLAIN

KEY MAP
1:90,000
0 90 180
1:6,500 METRES
Page: 1
Page: 2
Page: 3
Page: 4
Page: 5
Hardy Creek
Granby River
Kettle River
Overton Creek

REFERENCE(S)
1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.
2. CONTOURS, ROADS, VEGETATION, WATERCOURSES, AND WATERBODIES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE
RISK RATING FOR SOIL
VARIOUS - CENTRAL, EAST, SOUTH, WEST

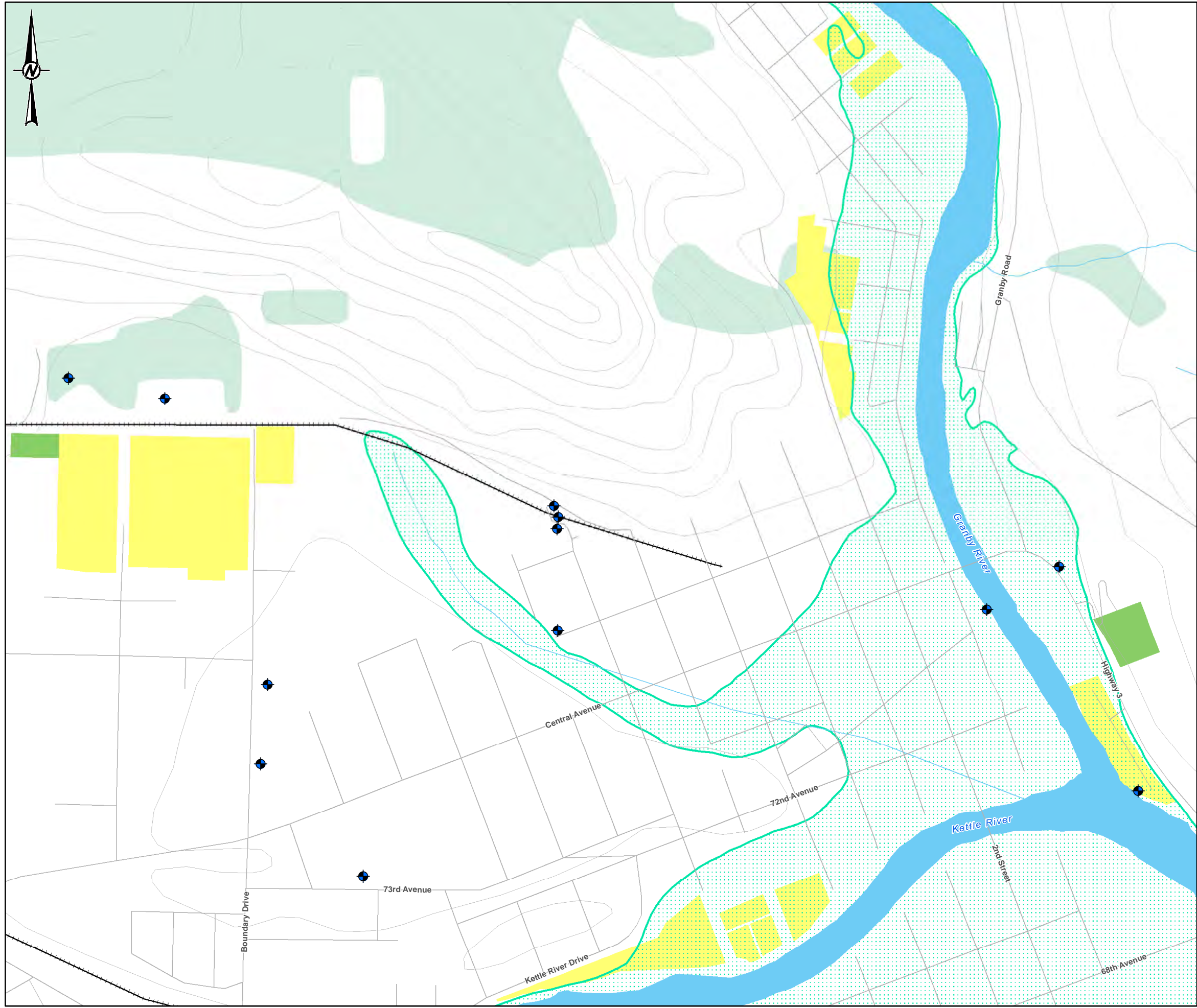
CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

	GOLDER
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PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 61 of 34

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 22mm

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LEGEND

GROUNDWATER WELL

RISK RATING FOR DEPTH TO GROUNDWATER

RISK 1: > 10 m

RISK 2: 3 - 10 m

RISK 3: 1 - 3 m

RISK 4: < 1 m

BASE DATA

ROAD

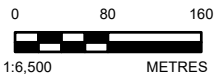
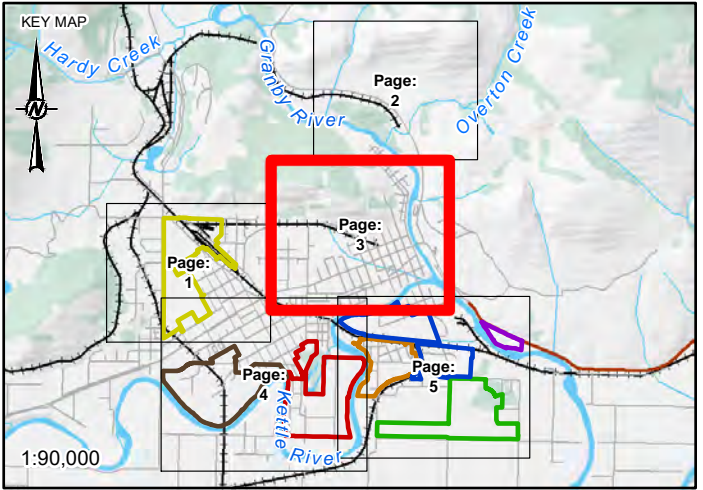
RAILWAY

CONTOUR (20m)

WATERCOURSE

VEGETATION

FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

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CLIENT

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PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

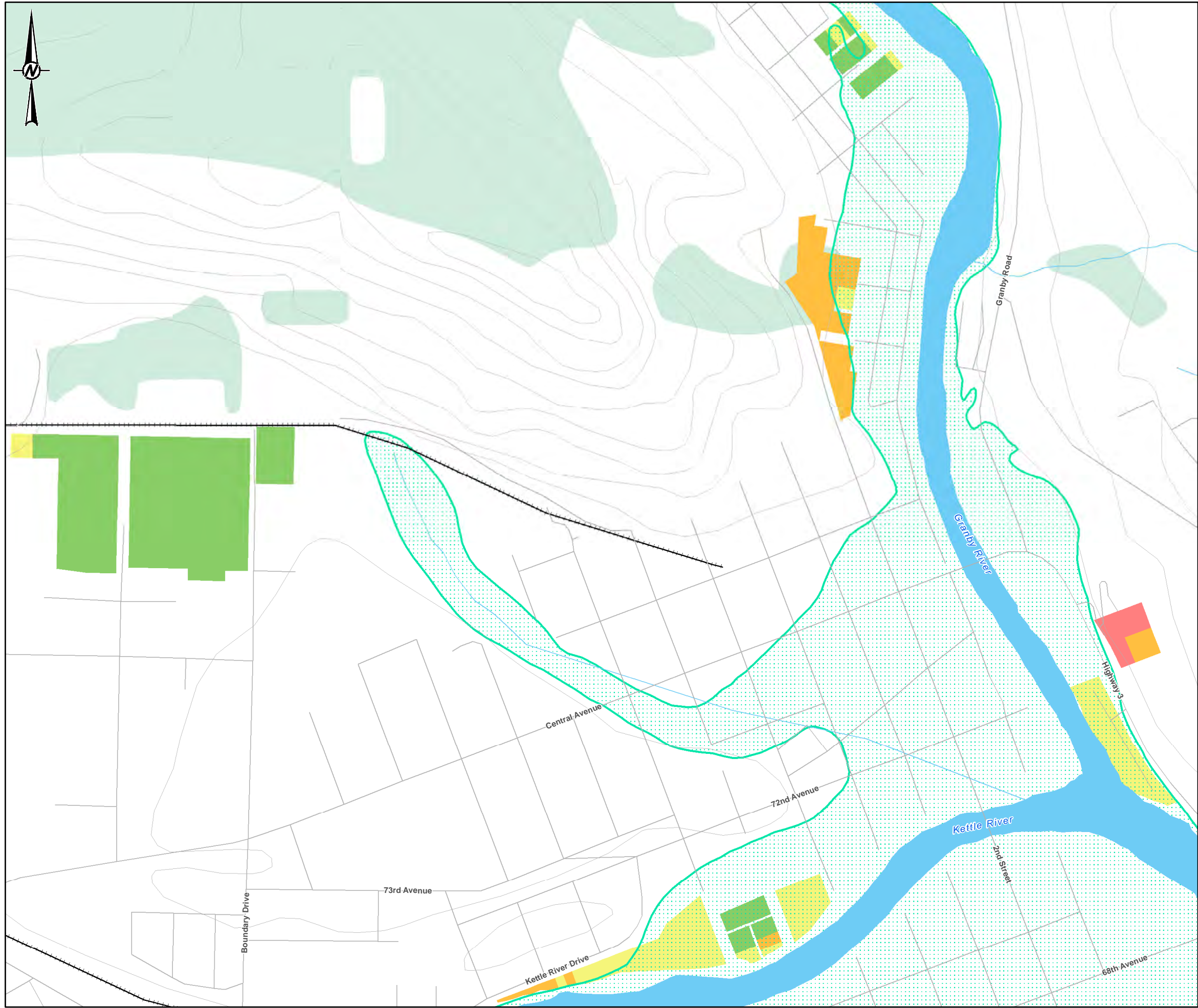
RISK RATING FOR DEPTH TO GROUNDWATER

VARIOUS - CENTRAL, EAST, SOUTH, WEST

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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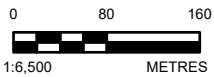
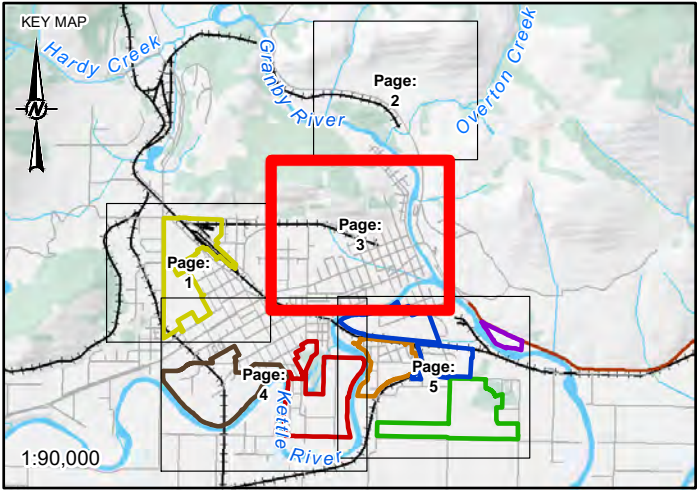
LEGEND

RISK RATING FOR SLOPE

- RISK 1: < 5 %
- RISK 2: 5 - 10 %
- RISK 3: 10 - 30 %
- RISK 4: > 30 %

BASE DATA

- ROAD
- RAILWAY
- CONTOUR (20m)
- WATERCOURSE
- VEGETATION
- FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

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PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

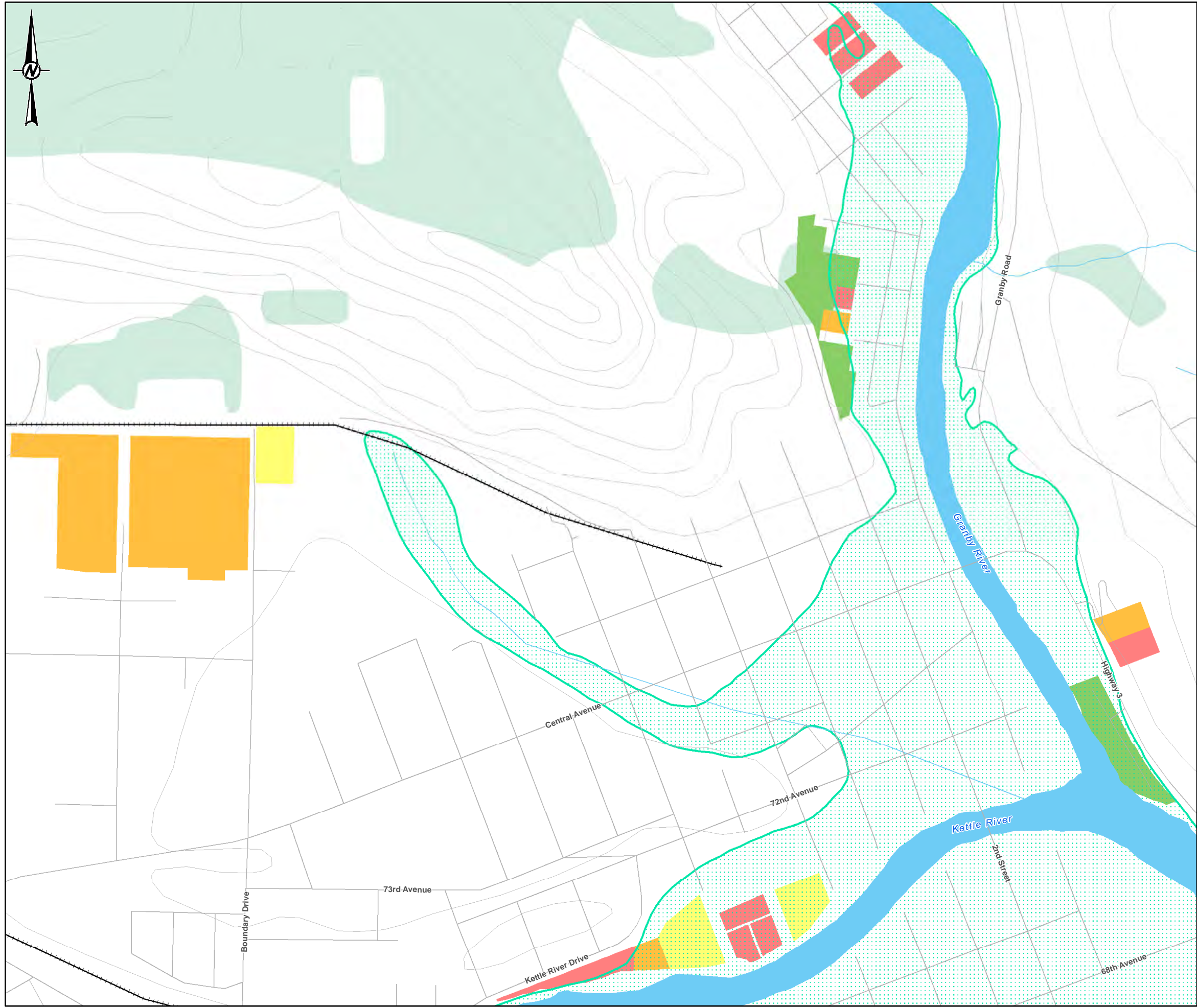
TITLE
RISK RATING FOR SLOPE
VARIOUS - CENTRAL, EAST, SOUTH, WEST

CONSULTANT	YYYY-MM-DD	3/16/2018
	DESIGNED	PA
	PREPARED	RC
	REVIEWED	PA
	APPROVED	JF

PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 34
Page 63 of 34

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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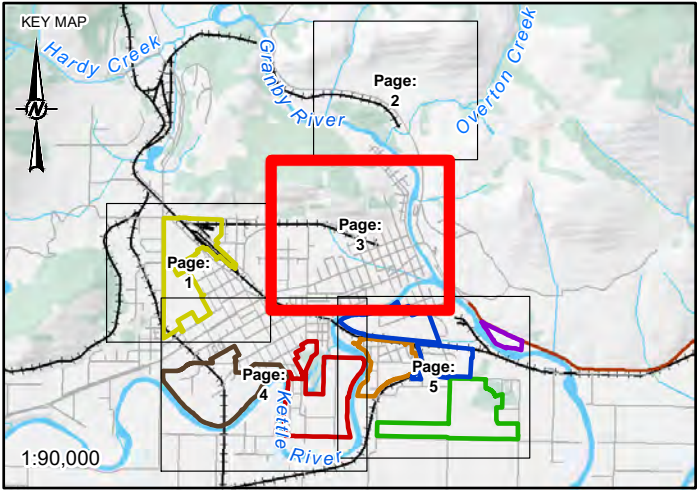
LEGEND

RISK RATING FOR PARCEL SIZE

- RISK 1: > 1 ha
- RISK 2: 0.5 - 1 ha
- RISK 3: 0.14 - 0.5 ha
- RISK 4: < 0.14 ha

BASE DATA

- ROAD
- RAILWAY
- CONTOUR (20m)
- WATERCOURSE
- VEGETATION
- FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

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CLIENT
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PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

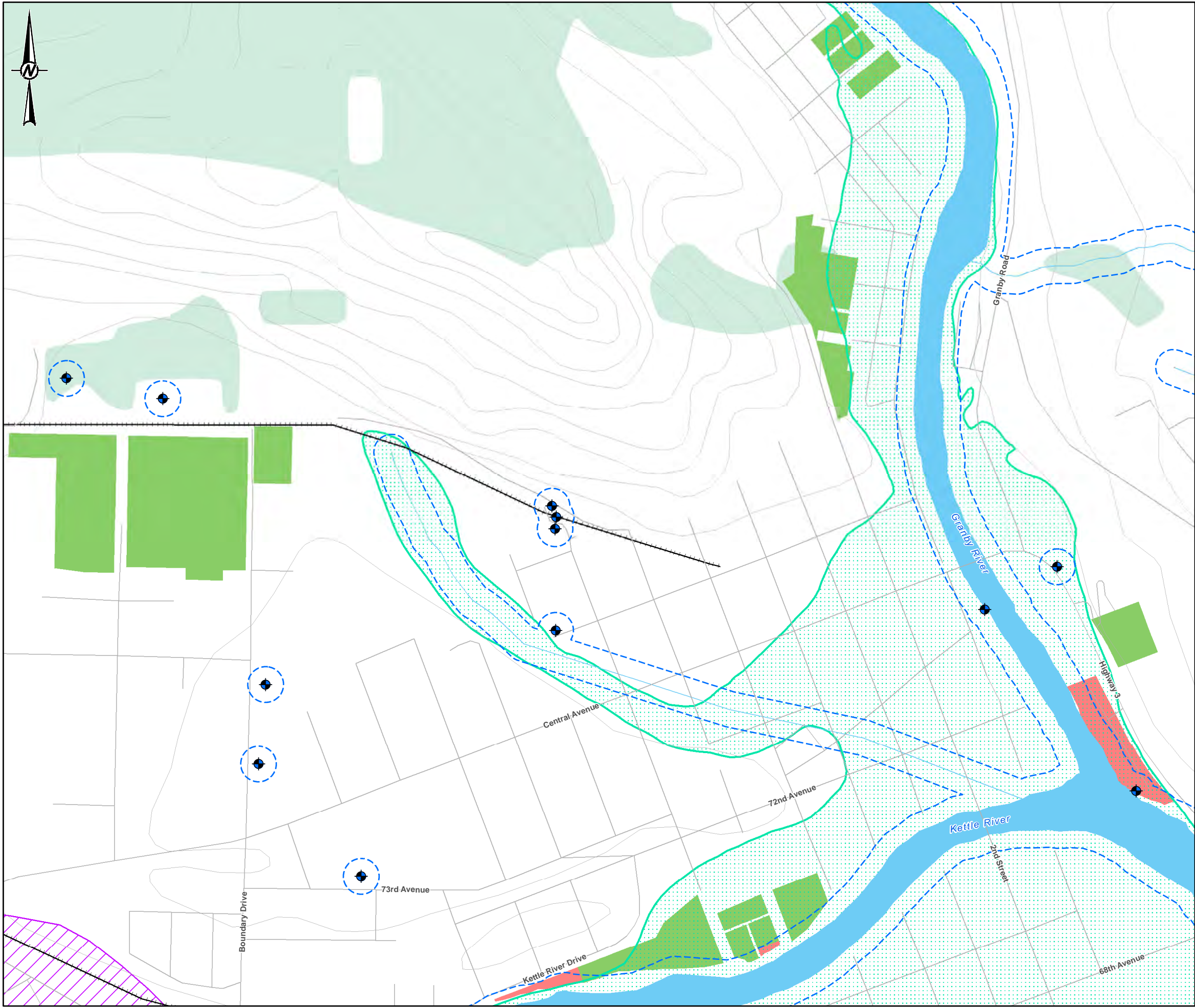
TITLE
RISK RATING FOR PARCEL SIZE
VARIOUS - CENTRAL, EAST, SOUTH, WEST

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

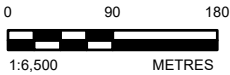
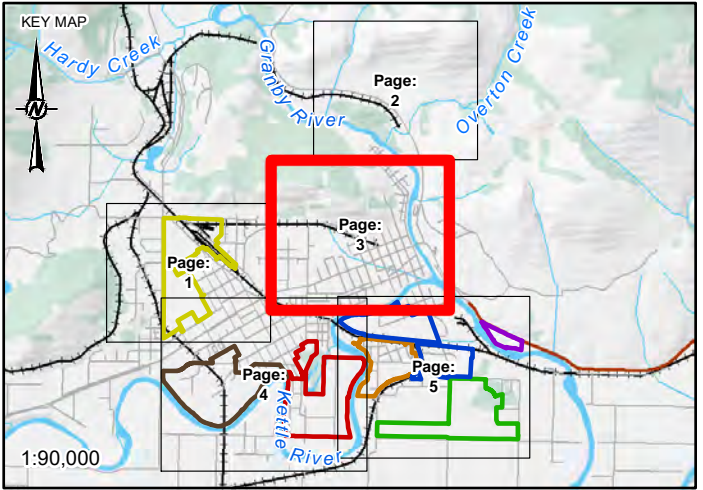
PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 34
Page 64 of 34

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- GROUNDWATER WELL
 - RISK RATING FOR SURFACE WATER SETBACKS AND WELL CAPTURE ZONES**
 - RISK 1
 - RISK 4
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - HORIZONTAL SETBACK FOR SURFACE WATER BODIES/WATER SUPPLY WELLS
 - FLOODPLAIN
 - WELL CAPTURE ZONE (10 YEAR)



REFERENCE(S)
1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.
2. CONTOURS, ROADS, VEGETATION, WATERCOURSES, AND WATERBODIES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

CLIENT
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PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

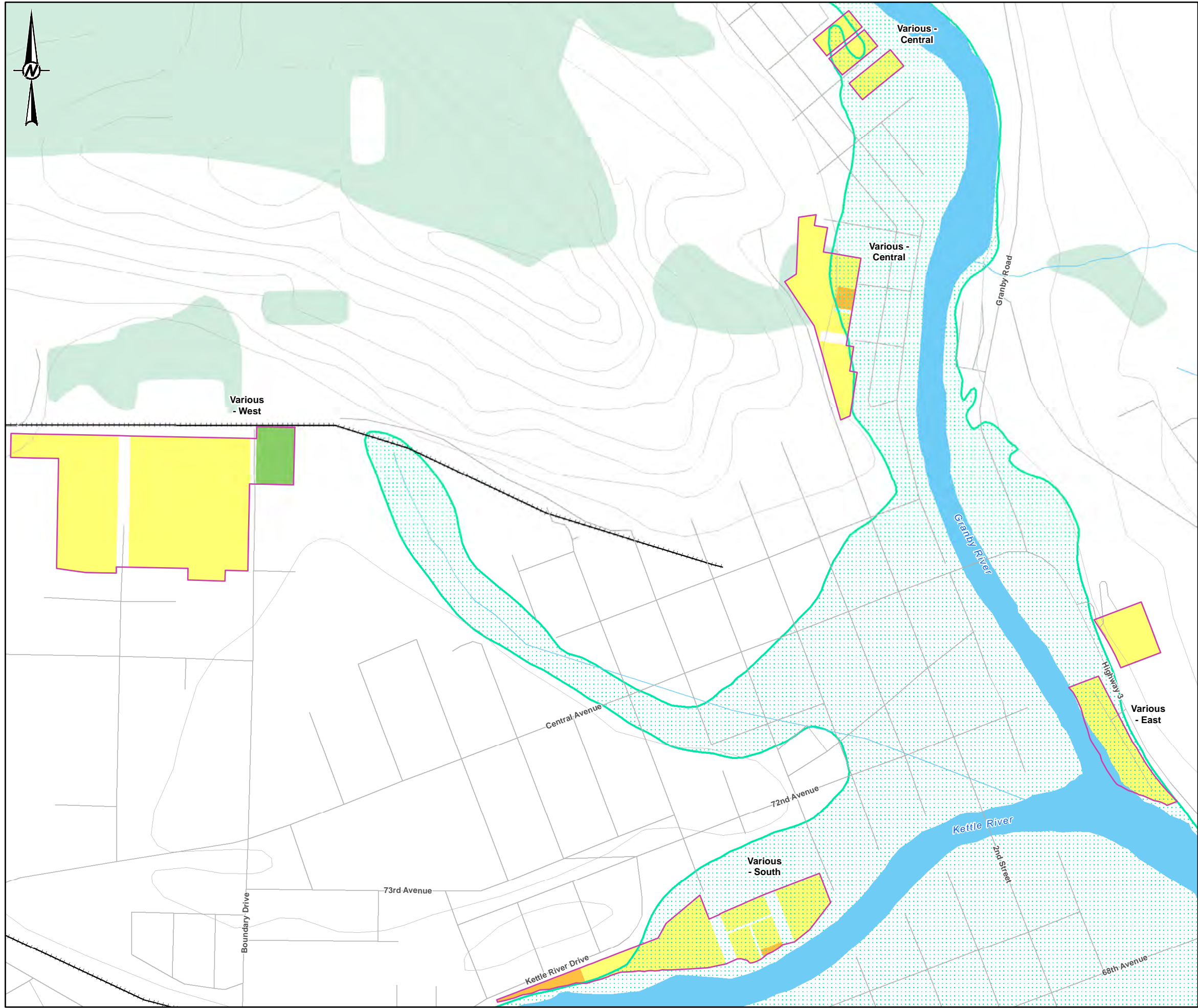
TITLE
RISK RATING FOR SURFACE WATER/WATER WELL SETBACKS AND WELL CAPTURE ZONES VARIOUS - CENTRAL, EAST, SOUTH, WEST

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

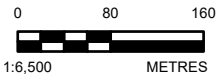
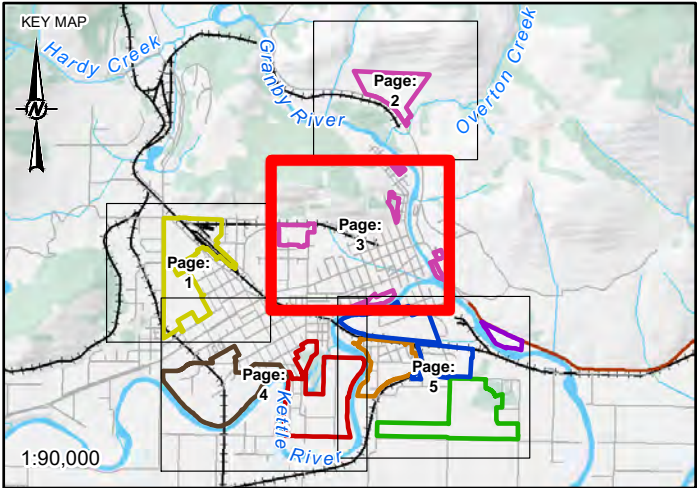


IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- SEWER REGION**
- VARIOUS
- FINAL RISK RATING**
- RISK 1
 - RISK 2
 - RISK 3
- BASE DATA**
- ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

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PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

FINAL RISK RATING

VARIOUS - CENTRAL, EAST, SOUTH, WEST

CONSULTANT	YYYY-MM-DD	3/16/2018
	DESIGNED	PA
	PREPARED	RC
	REVIEWED	PA
	APPROVED	JF

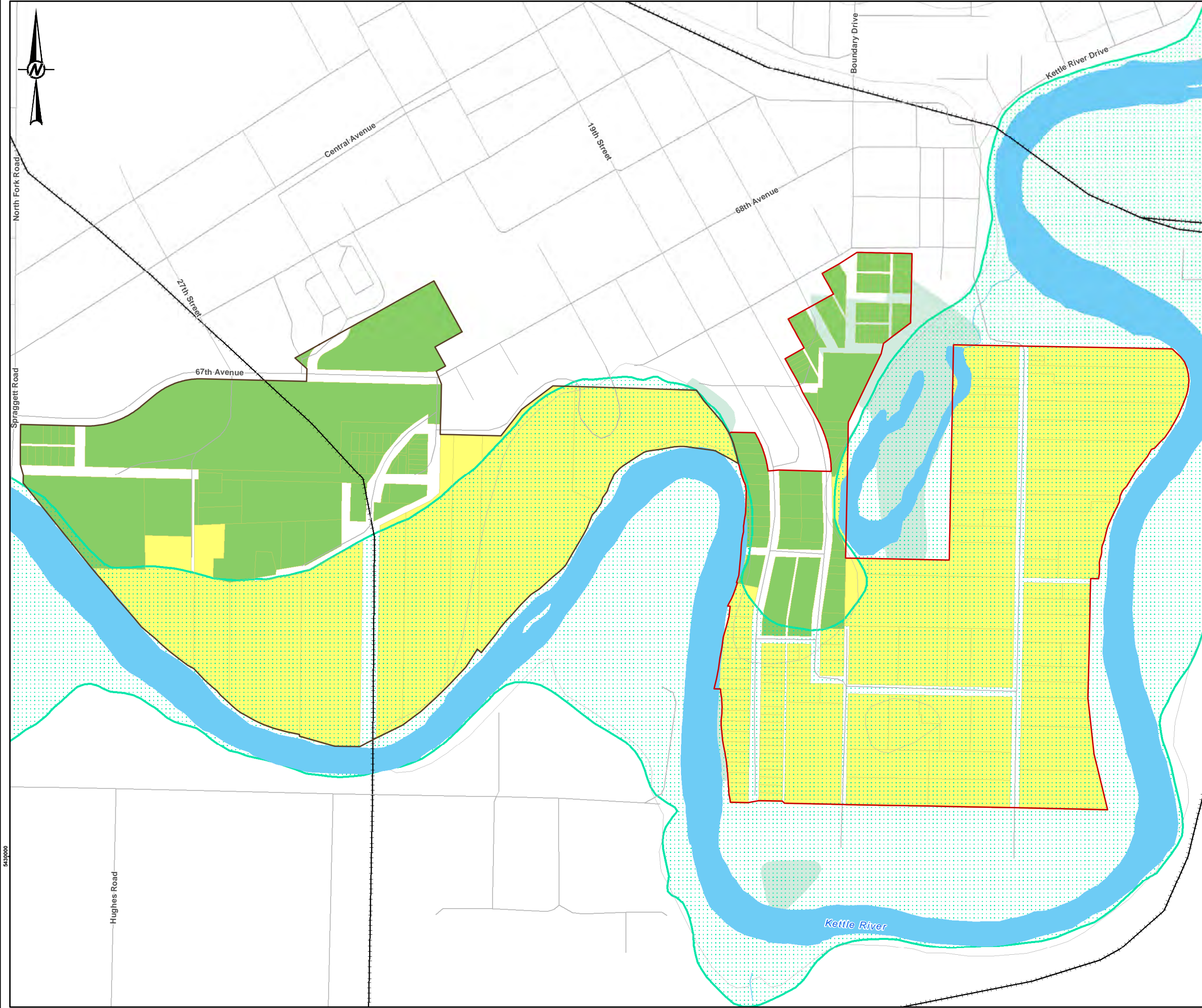


PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 66 of 94

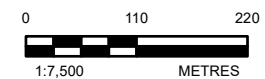
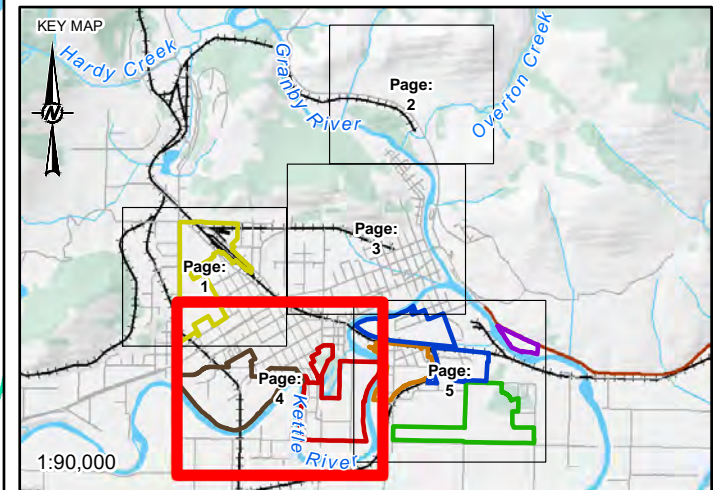
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

28mm

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- LEGEND**
- PARCEL
 - SEWER REGION**
 - JOHNSON FLATS
 - SW GRAND FORKS
 - RISK RATING FOR SOIL**
 - RISK 1: FLUVIAL / GLACIOFLUVIAL
 - RISK 2: FLUVIAL / GLACIOFLUVIAL WITHIN FLOODPLAIN
 - RISK 3: COLLUVIUM
 - RISK 4: TILL / COLLUVIUM OVER BEDROCK AND COLLUVIUM WITHIN FLOODPLAIN
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION
 - FLOODPLAIN



REFERENCE(S)

1. SEWER REGIONS PROVIDED BY THE CITY OF GRAND FORKS.

2. CONTOURS, ROADS, VEGETATION, WATERCOURSES, AND WATERBODIES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE
RISK RATING FOR SOIL
SW GRAND FORKS AND JOHNSON FLATS

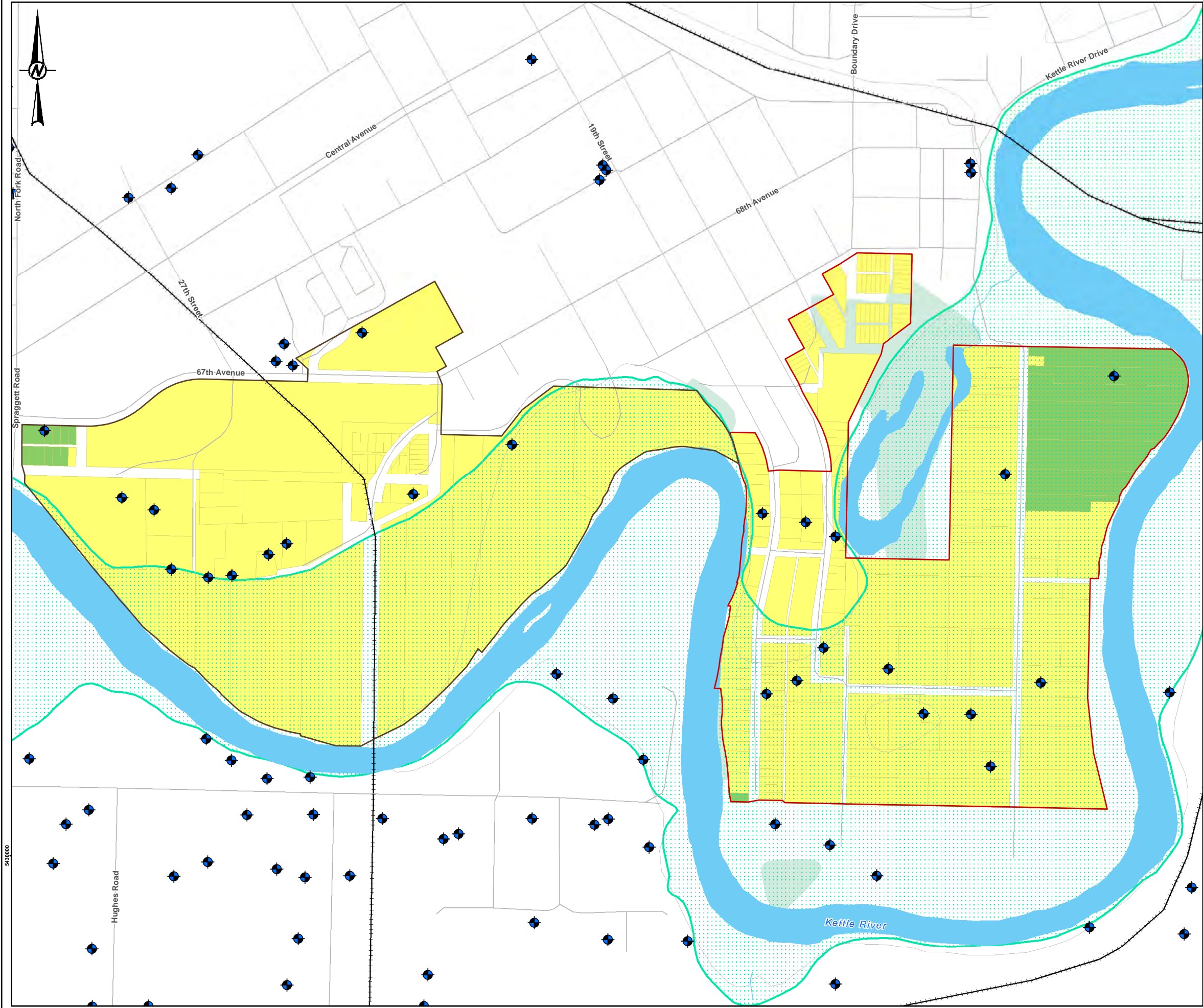
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DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



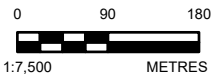
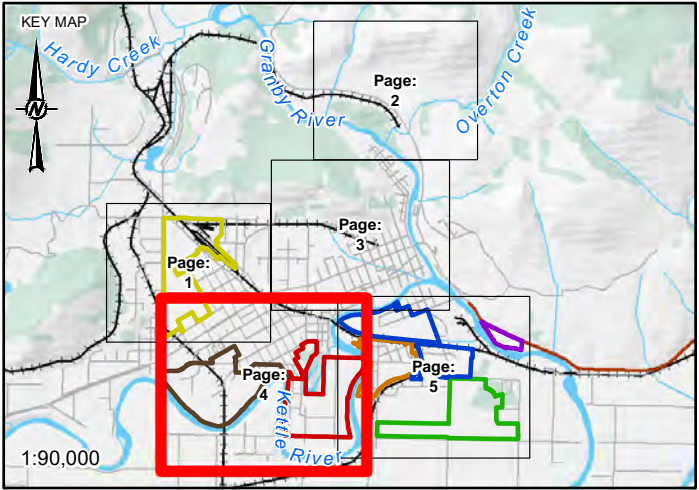
PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 44
Page 67 of 44

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 22mm

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- LEGEND**
- GROUNDWATER WELL
 - PARCEL
 - SEWER REGION**
 - JOHNSON FLATS
 - SW GRAND FORKS
 - RISK RATING FOR DEPTH TO GROUNDWATER**
 - RISK 1: > 10 m
 - RISK 2: 3 - 10 m
 - RISK 3: 1 - 3 m
 - RISK 4: < 1 m
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION
 - FLOODPLAIN



REFERENCE(S)

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CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE
RISK RATING FOR DEPTH TO GROUNDWATER
SW GRAND FORKS AND JOHNSON FLATS

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



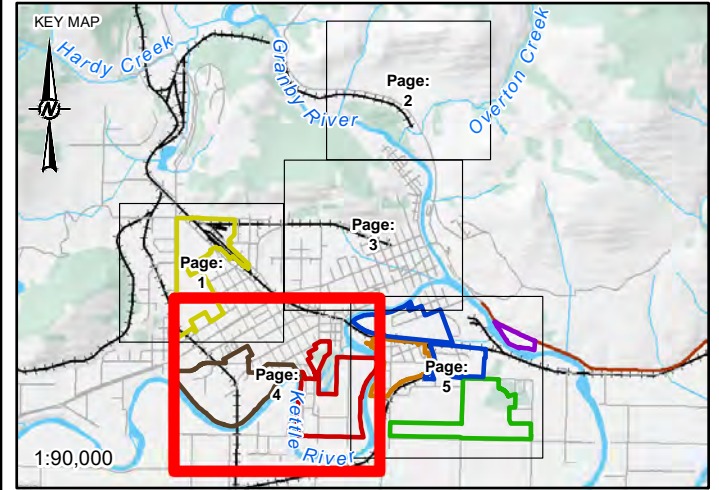
PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 44
Page 68 of 44

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

\\P07H\lgolder\golder\Burraby\CAD\GIS\Client\Urban Systems Ltd\Grand Forks\09_PROJECTS\1895271\02_PRODUCTION\1000\MapDocs\Report\1895271_1000_Figure_C_Risk_Rating_for_Slope_mapbook_Scanaro_3.mxd PRINTED ON: 2018-03-16 AT 4:35:29 PM



- LEGEND**
- PARCEL
 - SEWER REGION**
 - JOHNSON FLATS
 - SW GRAND FORKS
 - RISK RATING FOR SLOPE**
 - RISK 1: < 5 %
 - RISK 2: 5 - 10 %
 - RISK 3: 10 - 30 %
 - RISK 4: > 30 %
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION
 - FLOODPLAIN



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CLIENT

URBAN SYSTEM LTD.

PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

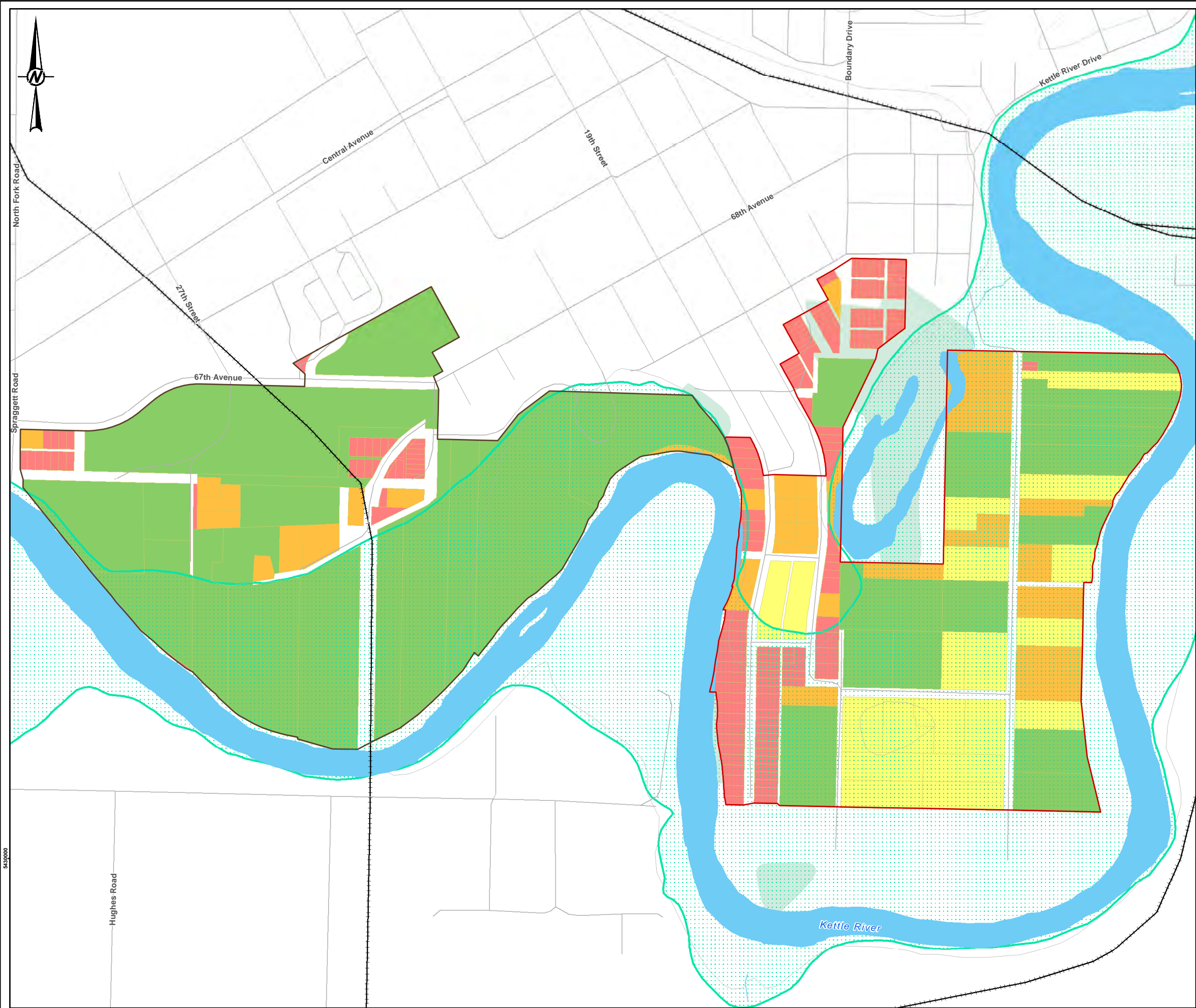
TITLE

RISK RATING FOR SLOPE
SW GRAND FORKS AND JOHNSON FLATS

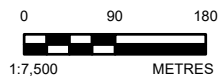
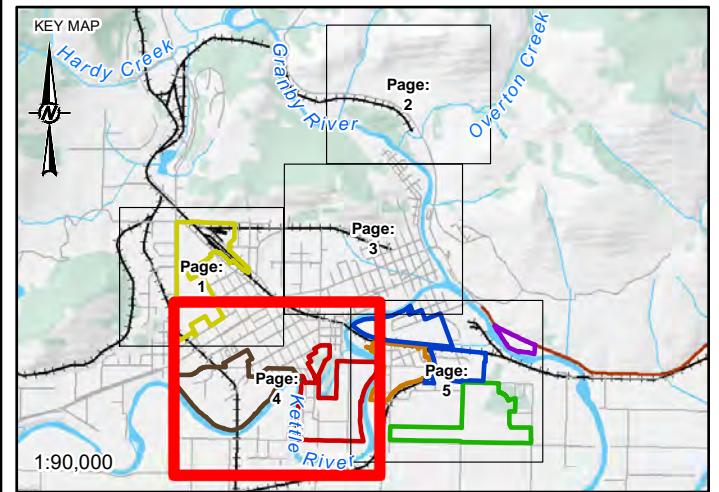
CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 22mm

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- LEGEND**
- PARCEL
 - SEWER REGION**
 - JOHNSON FLATS
 - SW GRAND FORKS
 - RISK RATING FOR PARCEL SIZE**
 - RISK 1: > 1 ha
 - RISK 2: 0.5 - 1 ha
 - RISK 3: 0.14 - 0.5 ha
 - RISK 4: < 0.14 ha
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION
 - FLOODPLAIN



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CLIENT

URBAN SYSTEM LTD.

PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

RISK RATING FOR PARCEL SIZE

SW GRAND FORKS AND JOHNSON FLATS

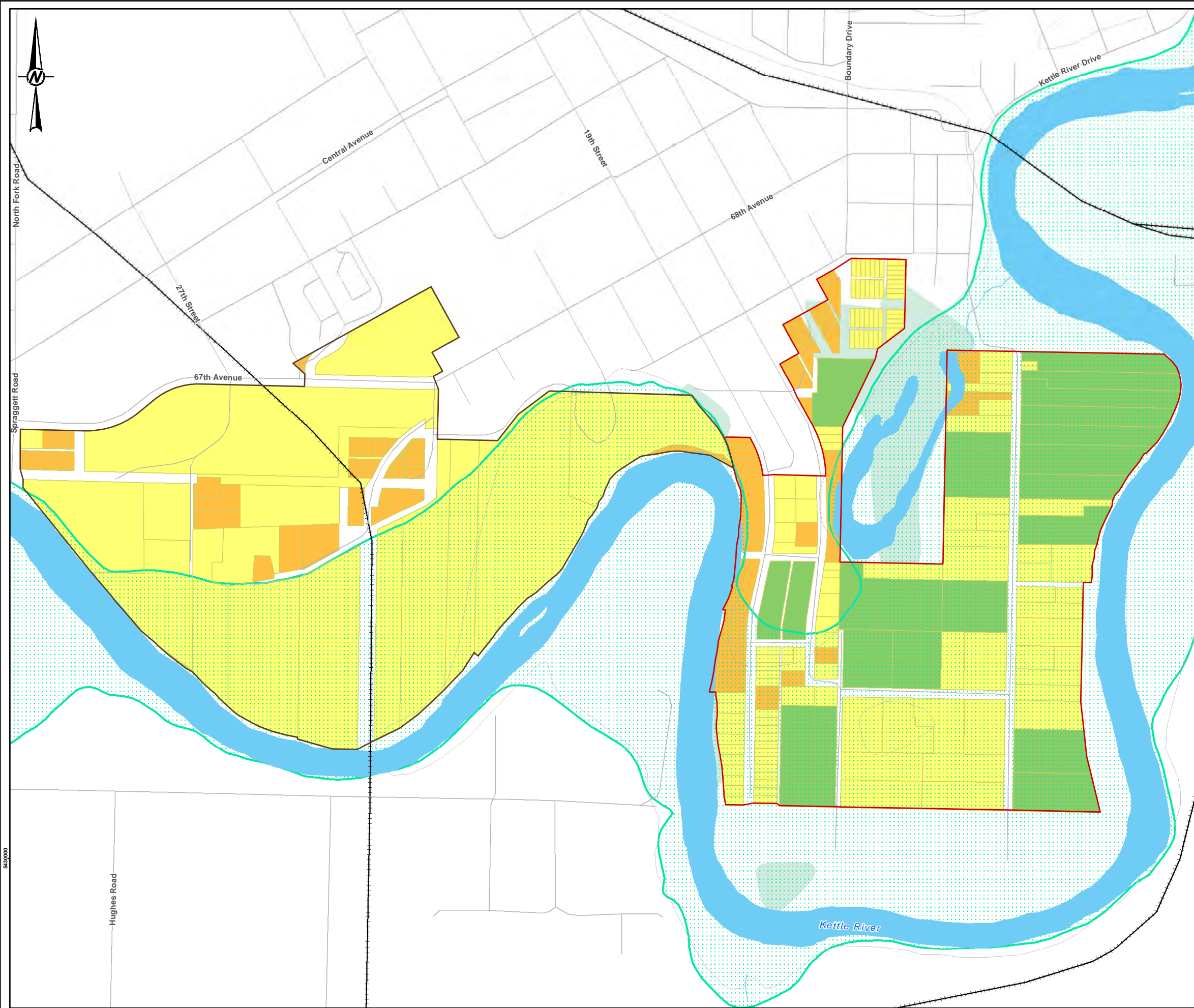
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DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



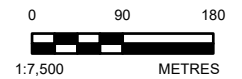
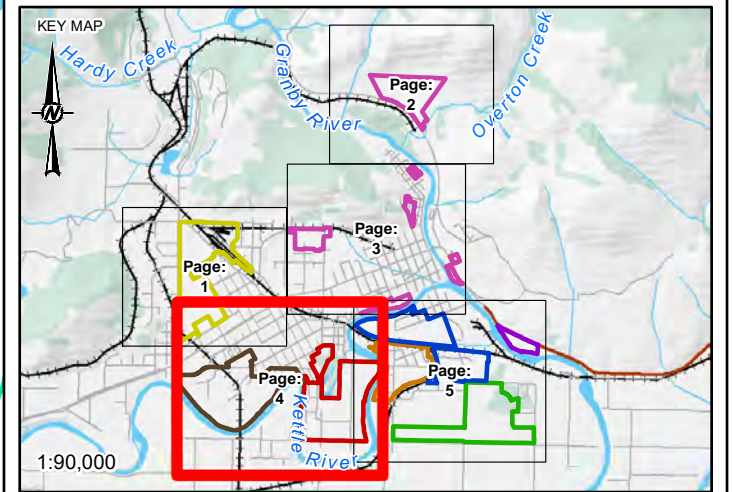
PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 70 of 49

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- PARCEL
 - SEWER REGION**
 - JOHNSON FLATS
 - SW GRAND FORKS
 - FINAL RISK RATING**
 - RISK 1
 - RISK 2
 - RISK 3
 - BASE DATA**
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION
 - FLOODPLAIN



REFERENCE(S)

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CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE
FINAL RISK RATING
SW GRAND FORKS AND JOHNSON FLATS

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



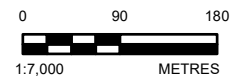
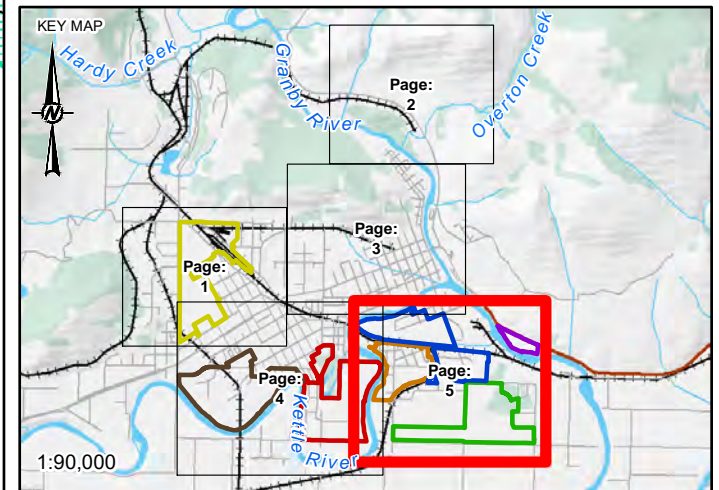
PROJECT NO.	CONTROL	REV.	FIGURE
1895271	1000	0	Page 72 of 94

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- GROUNDWATER WELL
 - PARCEL
 - SEWER REGION**
 - AIRPORT / INDUSTRIAL
 - HWY 3 EAST
 - RICHMOND / PW
 - SOUTH RUCKLES
 - RISK RATING FOR DEPTH TO GROUNDWATER**
 - RISK 1: > 10 m
 - RISK 2: 3 - 10 m
 - RISK 3: 1 - 3 m
 - RISK 4: < 1 m
 - BASE DATA**
 - HIGHWAY
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - FLOODPLAIN



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CLIENT

URBAN SYSTEM LTD.

PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

RISK RATING FOR DEPTH TO GROUNDWATER

RICHMOND / PW, SOUTH RUCKLES, AIRPORT / INDUSTRIAL, AND HWY 3 EAST

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



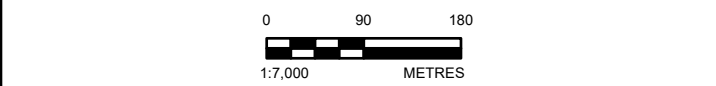
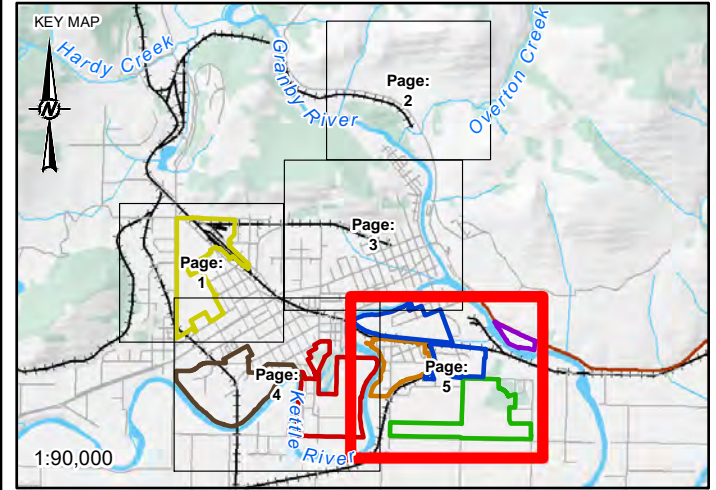
PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 94

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 20mm

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- LEGEND**
- PARCEL
 - SEWER REGION**
 - AIRPORT / INDUSTRIAL
 - HWY 3 EAST
 - RICHMOND / PW
 - SOUTH RUCKLES
 - RISK RATING FOR SLOPE**
 - RISK 1: < 5 %
 - RISK 2: 5 - 10 %
 - RISK 3: 10 - 30 %
 - RISK 4: > 30 %
 - BASE DATA**
 - HIGHWAY
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - FLOODPLAIN



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CLIENT

URBAN SYSTEM LTD.

PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

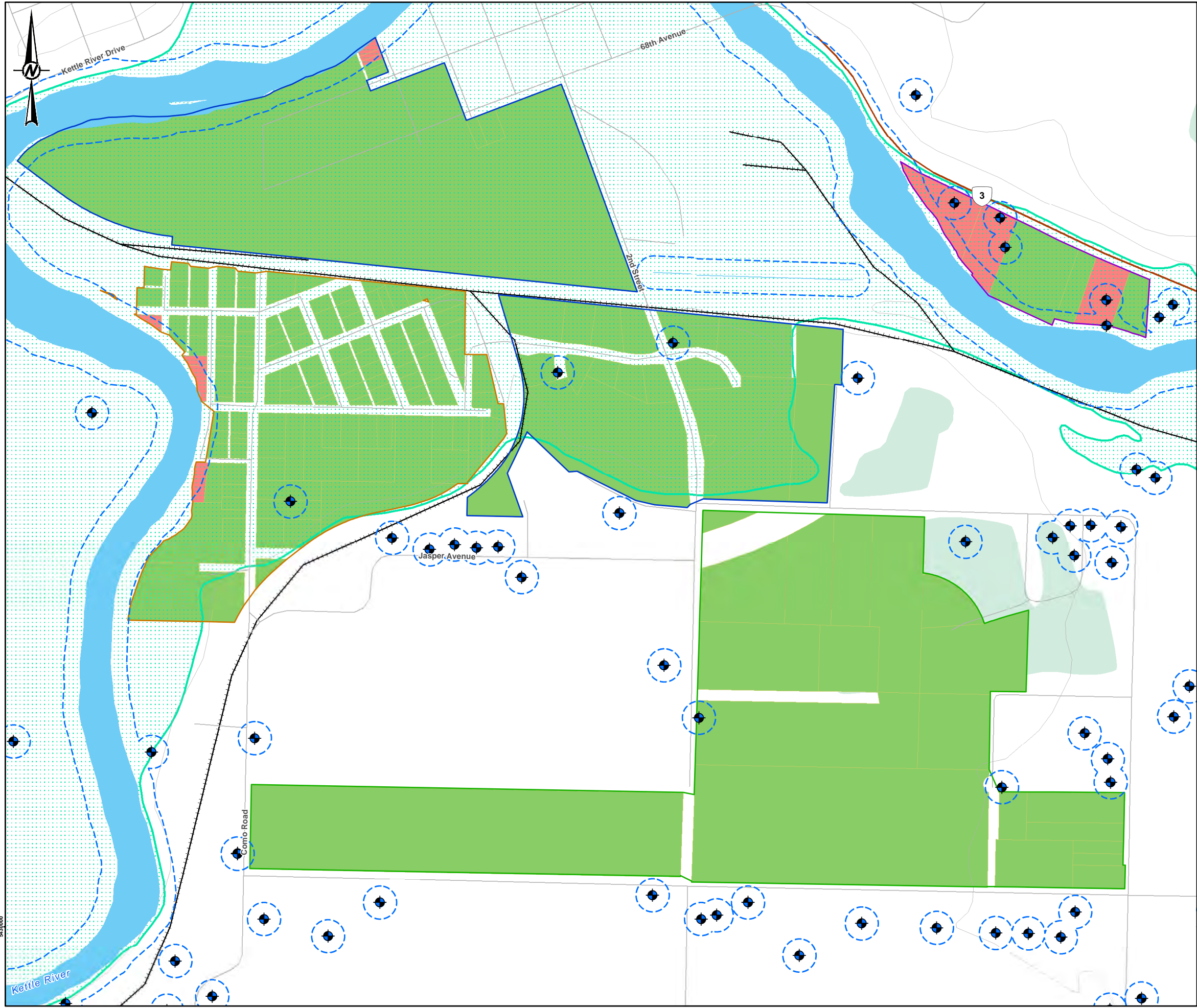
RISK RATING FOR SLOPE
RICHMOND / PW, SOUTH RUCKLES, AIRPORT / INDUSTRIAL, AND HWY 3 EAST

CONSULTANT	YYYY-MM-DD	3/16/2018
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

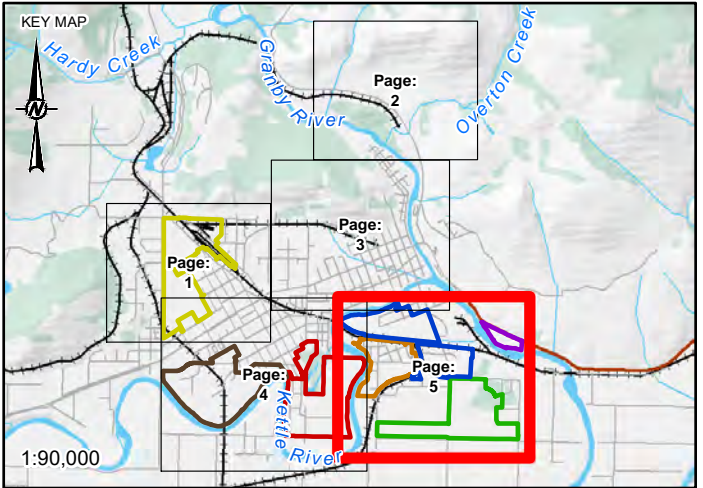
PROJECT NO. 1895271 **CONTROL** 1000 **REV.** 0 **FIGURE** Page 75 of 94

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- GROUNDWATER WELL
 - PARCEL
 - SEWER REGION**
 - AIRPORT / INDUSTRIAL
 - HWY 3 EAST
 - RICHMOND / PW
 - SOUTH RUCKLES
 - RISK RATING FOR SURFACE WATER SETBACKS AND WELL CAPTURE ZONES**
 - RISK 1
 - RISK 4
 - BASE DATA**
 - HIGHWAY
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - HORIZONTAL SETBACK FOR SURFACE WATER BODIES/WATER SUPPLY WELLS
 - FLOODPLAIN



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CLIENT

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PROJECT

URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE

RISK RATING FOR SURFACE WATER/WATER WELL SETBACKS AND WELL CAPTURE ZONES RICHMOND / PW, SOUTH RUCKLES, AIRPORT / INDUSTRIAL, AND HWY 3 EAST

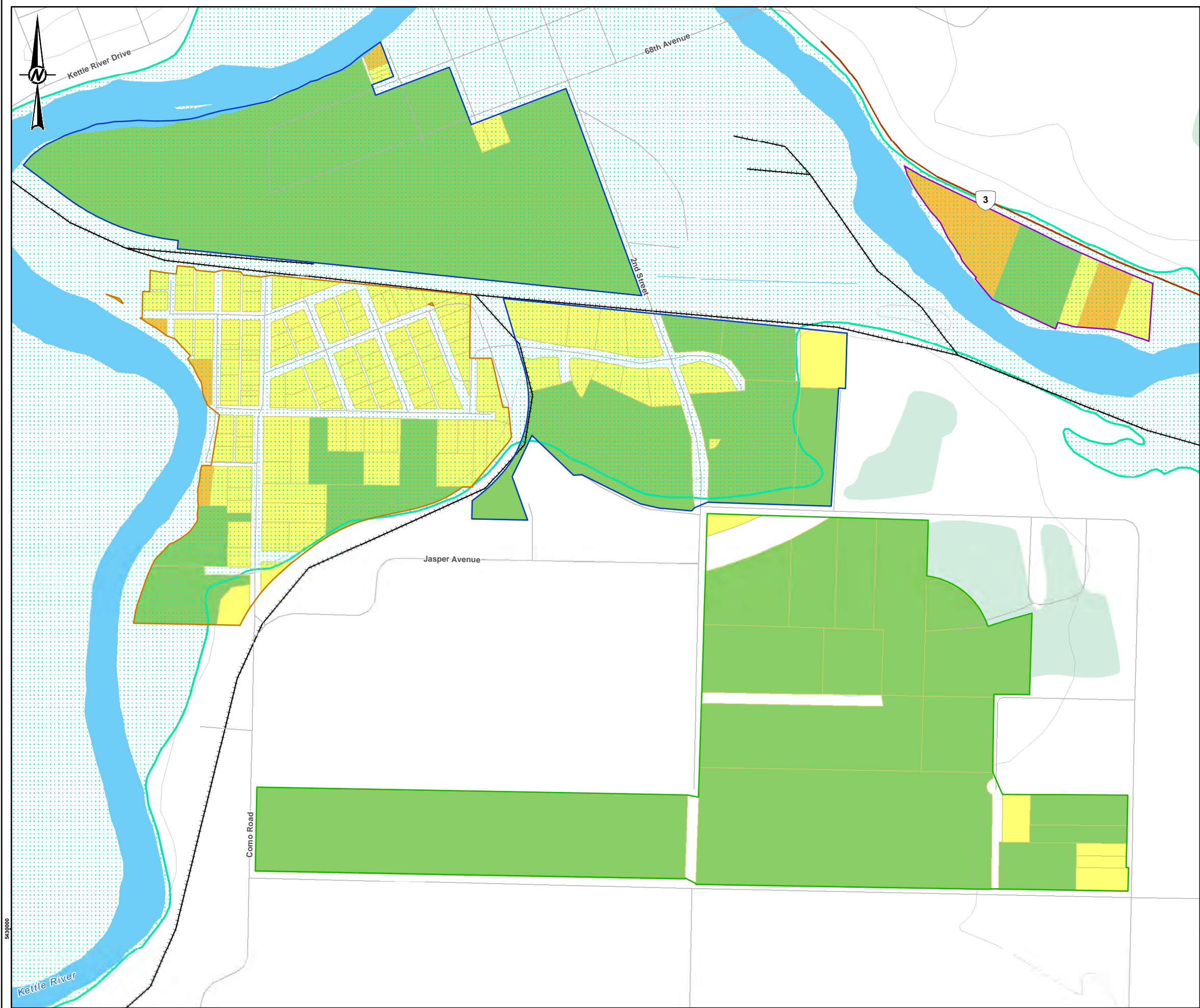
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DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



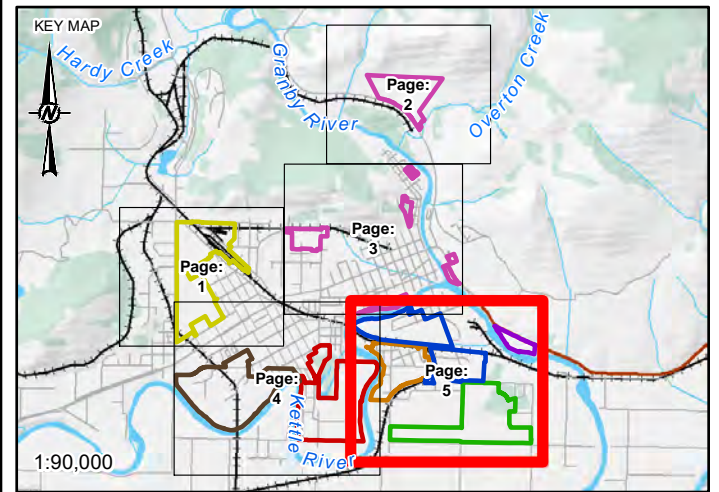
PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE 94

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- PARCEL
 - SEWER REGION**
 - AIRPORT / INDUSTRIAL
 - HWY 3 EAST
 - RICHMOND / PW
 - SOUTH RUCKLES
 - FINAL RISK RATING**
 - RISK 1
 - RISK 2
 - RISK 3
 - BASE DATA**
 - HIGHWAY
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - VEGETATION
 - FLOODPLAIN



REFERENCE(S)
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CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE
**FINAL RISK RATING
RICHMOND / PW, SOUTH RUCKLES, AIRPORT / INDUSTRIAL, AND HWY 3 EAST**

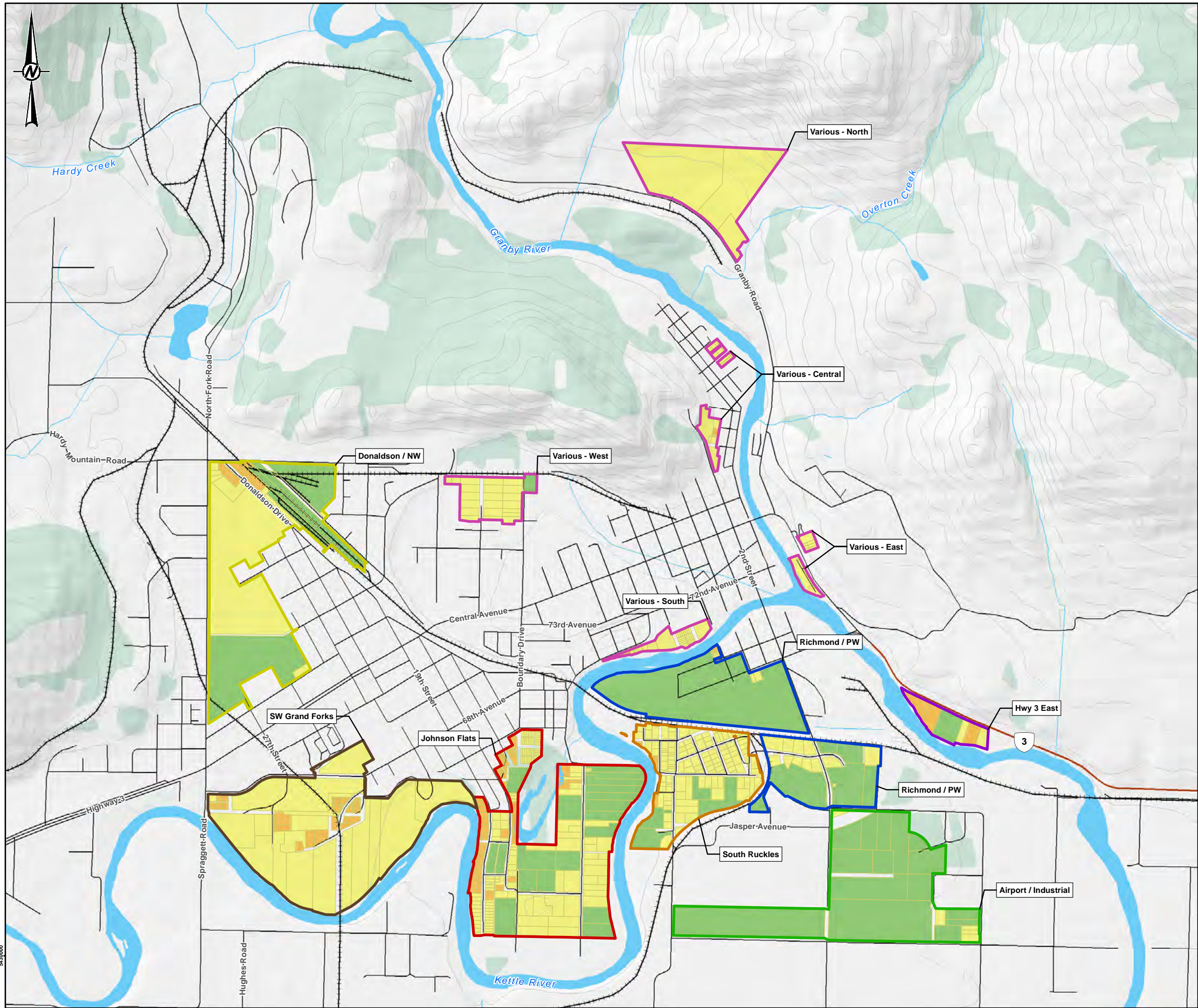
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DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	



PROJECT NO. 1895271	CONTROL 1000	REV. 0	FIGURE Page 78 of 94
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 22mm

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LEGEND

- PARCEL
- SEWER REGION
- AIRPORT / INDUSTRIAL
 - DONALDSON / NW
 - HWY 3 EAST
 - JOHNSON FLATS
 - RICHMOND / PW
 - SW GRAND FORKS
 - SOUTH RUCKLES
 - VARIOUS
- FINAL RISK RATING
- RISK 1
 - RISK 2
 - RISK 3
- BASE DATA
- HIGHWAY
 - ROAD
 - RAILWAY
 - CONTOUR (20m)
 - WATERCOURSE
 - WATERBODY
 - VEGETATION



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CLIENT
URBAN SYSTEM LTD.

PROJECT
URBAN SYSTEMS/SEWER/GRAND FORKS

TITLE
FINAL RISK RATING
OVERVIEW

CONSULTANT	YYYY-MM-DD	2018-03-16
DESIGNED	PA	
PREPARED	RC	
REVIEWED	PA	
APPROVED	JF	

PROJECT NO. 1895271 CONTROL 1000 REV. 0 FIGURE Page 79 of 94

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

APPENDIX B

Unit Costs

Table of Unit Prices (2018)	Unit	Price
1. 200mm Diameter PVC Gravity Sewer	l.m.	\$260
2. Manholes	Each	\$8,000
3. Service Connections	Each	\$2,800
4. Road Restoration (asphalt – 3.5m wide)	l.m.	\$120
5. 100mm Diameter PVC Forcemain	l.m.	\$180
6. Small Lift Station (under 5L/s)	Each	\$250,000
7. Medium Lift Station (5-10 L/s)	Each	\$300,000

Highway 3 East

500 @ \$440	\$220,000
Manholes: 4 @ \$8,000	\$32,000
Force mains: 1,200 @ \$300	\$360,000
Service Connections: 1 @ \$2,800	\$28,000
Pump Station	\$250,000
River Crossing	\$250,000
Rail Crossing	\$150,000
	\$1,290,000
Contingency (30%)	\$387,000
Engineering & Construction Services (15%)	\$253,000
	\$1,930,000
Rounded	\$2,000,000

PW / Richmond

600 @ \$440	\$264,000
Manholes: 8 @ \$8,000	\$64,000
Force mains: 200 @ \$300	\$60,000
Service Connections: 180 @ \$2,800	\$504,000
Pump Station	\$250,000
Highway Crossing	\$150,000
	\$1,292,000
Contingency (30%)	\$388,000
Engineering & Construction Services (15%)	\$252,000
	\$1,932,000
Rounded	\$2,000,000

Airport / Ind

1,400 @ \$440	\$616,000
Manholes: 8 @ \$8,000	\$64,000
Forcemains: 600 @ \$300	\$180,000
Service Connections: 10 @ \$2,800	\$284,000
Pump Station	\$250,000
	\$1,138,000
Contingency (30%)	\$342,000
Engineering & Construction Services (15%)	\$322,000
	\$1,702,000

South Ruckles

2,300 @ \$440	\$1,012,000
Manholes: 30 @ \$8,000	\$240,000
Forcemains: 540 @ \$300	\$162,000
Service Connections: 200 @ \$2,800	\$560,000
Pump Station	\$250,000
Rail / Highway Crossing	\$300,000
	\$2,524,000
Contingency (30%)	\$757,000
Engineering & Construction Services (15%)	\$492,000
	\$3,773,000

Johnson Flats

3,000 @ \$440	\$1,320,000
Manholes: 26 @ \$8,000	\$208,000
Forcemains: 1,200 @ \$300	\$360,000
Service Connections: 20 @ \$2,800	\$56,000
Pump Station	\$250,000
	\$2,194,000
Contingency (30%)	\$658,000
Engineering & Construction Services (15%)	\$428,000
	\$3,280,00

SW GF

2,400 @ \$440	\$1,056,000
Manholes: 20 @ \$8,000	\$56,000
Forcemains: 800 @ \$300	\$240,000
Service Connections: 10 @ \$2,800	\$28,000
Pump Station	\$250,000
	\$1,630,000
Contingency (30%)	\$489,000
Engineering & Construction Services (15%)	\$318,000
Total	\$2,437,000

Donaldson

500 @ \$440	\$220,000
Manholes: 8 @ \$8,000	\$64,000
Forcemains: 500 @ \$300	\$150,000
Service Connections: 15 @ \$2,800	\$42,000
Pump Station	\$250,000
	\$726,000
Contingency (30%)	\$218,000
Engineering & Construction Services (15%)	\$142,00
Total	\$1,086,000

Request for Decision



To: Committee of the Whole

From: **Corporate Services / Administration**

Date: May 7, 2018

Subject: Urban Systems Ltd. – Delegation on SSAT (Service Sustainability Assessment Tool)

Recommendation: **THAT the COTW recommends to Council to receive the information, as provided by Urban Systems Ltd., and to refer the matter to the May 7th Regular Meeting for consideration to adopt the Service Sustainability Assessment Tool as a reporting tool for use towards determining the City's performance measurements.**

Background

Early in 2016, the City of Grand Forks hosted the project which was 100% funded through the 2016 Gas Tax Strategic Priorities Fund and was developed by Urban Systems. Five other communities worked in concert with the project. The program's objective was to provide a measurement tool for both Council and staff, and thus determine where improvements were required.

On April 9th, 2018 Urban Systems conducted a workshop for Council to get an idea on how the tool intends to function. Urban Systems Ltd. is now presenting the SSAT at the COTW in order to publicly present the tool, and to further to have Council consider adopting the tool at tonight's Regular meeting for best practices use for the organization.

Benefits or Impacts

General

Council has the authority to authorize the use of programs and tools to assist the organization in determining present and future needs or requirements.

Strategic Impact



Community Livability

- Performance Measurements in place to gauge quality of services



Fiscal Responsibility

- To better plan for future projects through best practices in measuring capital needs or upgrades

Policy/Legislation

Council has the authority to authorize the use of programs and tools to assist the organization in determining present and future needs or requirements.

Attachments

- Snapshot of the Service Sustainability Assessment Tool for Canadian communities

Recommendation

THAT the COTW recommends to Council to receive the information, as provided by Urban Systems Ltd., and to refer the matter to the May 7th Regular Meeting for consideration to adopt the Service Sustainability Assessment Tool as a reporting tool for use towards determining the City's performance measurements.

Options

1. RESOLVED THAT Committee of the Whole accepts the report.
2. RESOLVED THAT Committee of the Whole does not accept the report.
3. RESOLVED THAT Committee of the Whole refers the matter back to staff for further information.

Performance Improvements: Service Sustainability Assessment Tool for Canadian Communities

What is the Service Sustainability Assessment Tool?

The Service Sustainability Assessment Tool (SSAT) is a simple tool that helps communities self-assess their sustainable service delivery performance in eight core services:



The tool is intended to be used by any local government, of any size, and at any stage of reviewing the way that services are delivered.

The SSAT tool will help you:

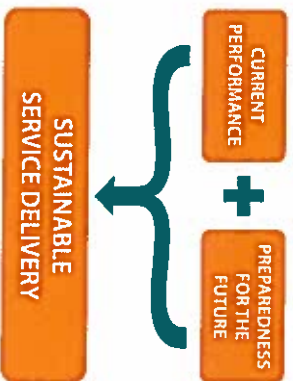
- Communicate to Council / public about sustainability
- Identify where services are doing well
- Identify where the sustainability of the service is at risk
- Develop plans to improve service provision sustainability
- Track progress over time

A service is sustainable if it is possible for the community to meet present needs without compromising the community's ability to meet future needs.

Given this definition, the SSAT assesses both current performance and preparedness for the future.

What does the tool look like?

The SSAT is an Excel file with an accompanying 3-page User Guide. Each service area has its own Excel page with questions related to both **Current Performance** and **Preparedness for the Future**. Scores in each of these two areas are combined to give an overall measure of Sustainability for the service.



The SSAT is quick and easy to fill out. For each measure, enter a score between 0 and 3 that best describes the situation in your community. It should take approximately 15 minutes to complete one service area assessment. As an example, here is one of the twenty-one questions from the Water page:

SCORE	WATER QUALITY - SAFETY
0	Boil advisories occur in most years
1	Boil water advisories occur, but infrequently (no more than every 5 years)
2	Water quality consistently meets schedule B testing requirements of the DWPR.
3	Water quality consistently meets Schedule B of the DWPR requirements, plus testing is done for additional risk parameters

How are the results communicated?

Once scores have been entered, click "Generate Report" in the Excel file. The Excel file will automatically generate three different dashboards that can be used to meet different communication needs.



DASHBOARD #1 | AUDIENCE: COUNCIL / PUBLIC



DASHBOARD #2 | AUDIENCE: SENIOR MANAGERS

DASHBOARD #3 AUDIENCE: DEPARTMENT STAFF			
WATER	CURRENT PERFORMANCE	PREPAREDNESS FOR THE FUTURE	OVERALL SUSTAINABILITY
Service Delivery	90%	70%	75%
Finance	75%	90%	80%
Governance	60%	80%	75%

Where can I find the SSAT?

The SSAT is available for free to all BC municipalities at assetmanagementbc.ca

SUBMISSION BY:

URBAN
systems

CLIENT:

GRAND FORKS

SPECIAL THANK YOU TO:

INNOVIA

Doug Allin, CAO
Township of Spallumcheen

UBCM

City of Rossland
Village of Salmo
District of Clearwater

District of Squamish
District of Central Saanich
District of Saanich



ASSOCIATION OF CONSULTING
ENGINEERING COMPANIES
BRITISH COLUMBIA

Monthly Highlight Report



To: Committee of the Whole
From: **Management Team**
Date: May 7, 2018
Subject: Monthly Highlight Report
Recommendation: **THAT COUNCIL receives the monthly highlight report for information.**

Fire Department

General

Calls this month: April numbers not available at time of writing
Year to date calls:

- ❖ Preparation for Freshet underway
 - Received sandbag order from province to boost local stockpile. Last year, we distributed over 80,000 sandbags throughout Boundary.
 - Some local creeks have experienced high streamflow as low-to-mid-level snow melted in mid-April.
 - Snowpack levels are well above normal. Actively monitoring temperatures and weather at snowpack elevations to gauge the melt rate.
- ❖ New Deputy Chief George Seigler started with the department in April.
- ❖ Grassfire season underway, as well as several instances of unpermitted burning inside City limits.
- ❖ Work with Kelowna Fire to prep for dispatch transition in mid May.
- ❖ Kevin – LGMA course

Outside Works

General

- Preparation for LED Streetlight project continued.
- Spare assets were put up for sale – radiators and old well motor.
- Campground contracts and rates finalized.
- GIS software transition continued.
- Safety conference for WorkSafe requirements.
- Manager of Operations – LGMA course.
- Worksafe BC confined space audit.
- WWTP electrical upgrade.
- Voltage Conversion.
- Granby River force main crossing.
- Sewer main relining RFP.

HR

Temporary Industrial Electrician started.

Summer staff up:

- Two temporary Operator 1 started.
- One temporary Utilities Operator 1 started.
- One temporary Operator 2 started.
- Student interviews continued.

Electrical

Planned outages: 7

Unplanned outages: 1

Summary of works:

- Set one pole and anchor for contractor
- Set two poles and three anchors for new primary line extension
- Contractor changed poles, transformers and primary conductor between 4th and Riverside Drive
- Replaced 11 porcelain cutouts and added 8 lightning arrestors to underground cable system
- Changed 8 cross arms
- Replaced five overhead transformers and seven pad mount transformers
- Installed two new temporary and two new permanent electrical services
- Designed and ordered material for switchyard wiring upgrade

Public Works

- Winter cleanup
 - Street sweeping and washing away road sand and debris completed
 - Clean up of all winter snow dump areas and Granby road completed
- Parks preparation
 - Spring cleanup all parks and green spaces completed
 - Irrigation turn-ons and repairs underway
 - Aerating all play fields and high traffic green spaces completed
 - Ball fields ready for play / Tennis and Pickle ball courts fully operational
 - Bartlett field #2 hard ball pitcher's mound created.
 - All public washrooms cleaned and ready for opening in May
- Portable planter annual displays created and growing in the green house
- Organizing and clean out of Public Works storage area completed
- Repair of loading dock rear of City Hall completed
- Campground spring clean / repair prep for opening May 1st

Event Support

- Easter Egg Hunt at City Park
- Rare Bird Review at Masonic Hall
- ATV Club 10th Anniversary at Gyro Park

Water and Sewer

- Two sewer service blockages
- 3rd St. sewer and water service repair
- Commercial water service replacement

- Water Distribution flushing 65% complete

Development and Engineering

General

- Hiring of temporary Planning Technician II

Capital Projects

- Finalized tender process for 72nd Ave Sidewalk
- 22nd St. Water valve assessment and design completed; public mail out
- Wastewater / UV in progress – tender package
- Biosolids land application options review underway
- Initiated review of Utility Right of Way for Central

Long Range Planning

- Introduced Zoning Bylaw Amendment 2039-A1 for Cannabis Retail and Production and Processing Use
- Initiated scoping of lands for protected areas network
- Led or participated in tours regarding nature parks and floodplain function
- Prepared for kick-off of Floodplain Mapping and Hazard Assessment Project

Current Planning

- Implementing of OCP and Zoning Bylaw changes in planning procedures
- Completed Temporary Use Permit for camping / special event / recreational property
- Continued facilitation of two subdivisions
- 62 public enquiries from public and developers (lot lines, permitted uses, development suitability)

Business Licences

- Processed 5 business licences

Building Inspection and Bylaw Enforcement

General

- Homeless complaints on the rise
- 7212 Riverside Drive (Whispers) demolition preparation, expected in May
- Building Permit for B.C. Housings Women's Transition House (\$1.98 million)

Bylaw Services

- Granby River motorhome now inexplicably parked in the moto-cross area, to be removed soon (to the landfill if not relocated by owner)
- Informing homeless campers of new park access bylaw time limitations, receiving mostly positive response (with RCMP assistance)

- Burnt camp behind the BMX track cleaned up, landfill costs for local riverbank clean up activity being payed out of bylaw enforcement budget (less than \$100) with expectations that costs will be recovered from the province
- Discussions with provincial Crown land ministries proving relatively fruitless, awaiting Keremeos decision regarding municipal License of Occupation on Crown land for municipal bylaw enforcement jurisdiction
- 4 unsightly residential properties in process of resolution
- Traffic Regulation Bylaw activity on the rise
- 2 calls for RCMP assistance
- Expectation requests sent to 7 business owners regarding container storage

Building Inspection

Building Permit applications this month: 6
 Year to date Building Permit applications: 24
 Year to date construction value: \$3,504,290 (last year total was \$3,762,202)

Corporate Services

General

- Prepared and facilitated Council Meetings
- Human Resources Duties
- Generalized IT support
- Continuation of Event Planning transition to Public Works Event Coordinator
- Records Management Update and review – ongoing project for 3 years:
 - reviewed and updated FOI Bylaw – 3 readings
 - reviewed and updated Retention Bylaw – 3 readings
 - SharePoint as records storage location:
 - Continued research
 - Naming conventions review
 - Job classifications
 - retention and disposition labeling review
- ESRI GIS software – continued configurations
- Preparations and facilitation of All Staff meeting
- Attended LGMA chapter meeting & Elections Workshop (Chief Administrative Officer & Deputy Corporate Officer)
- Secondhand dealers and pawnbrokers Bylaw continued review

Financial Services

General

- Adoption of Five Year Financial Plan Bylaw, 2018-2022, No. 2045
- First three readings of 2018 Tax Rates Bylaw, No. 2046
- Completed draft 2017 financial statements for final auditor review
- Prepared data for Local Government Data Entry and draft SOFI report
- Participated in webinars for Assessment Appeal Process and Local Government Current Issues
- Attended EOC activation planning session

- Responded to requests from the public and organizations on property taxes, utilities and permissive tax exemptions
- Prepared letters for non-profit organizations for permissive tax exemption applications. Early application deadline due to October election.

Recommendation

THAT the Committee of the Whole receives the monthly highlight report for information.

Request for Decision



To: Committee of the Whole
From: **Engineering and Development**
Date: May 7, 2018
Subject: Fees and Charges Bylaw Amendment – Business Fees and Charges
Recommendation: **THAT Committee of the Whole recommends to Council to give the first three readings to the “City of Grand Forks Fees and Charges Amendment Bylaw No. 1958-A5, 2018” at the May 22, 2018 Regular Meeting.**

Background

Business Fees

The City often receives event requests for the use of municipal properties for commercial purposes like festivals or sale of goods. Two concrete examples from the last couple of years are the outdoor movie theatre and the camping in Dick Bartlett Park for Cannafest. The old Policy 114 included guidance on charging for the temporary use of the property, but when it was updated last year, Council decided to not include the “Business Fees and Charges” schedule in the Fees and Charges Bylaw amendment. Recent Council correspondence has indicated a fresh interest in the ability to charge businesses when they are using municipal property. Staff are reintroducing the schedule so that the City may charge businesses using municipal properties in 2018.

Council considered this topic at the April 9, 2018 Regular Meeting when it was combined with the campground fees and charges amendment. They requested that this portion come back to a Committee of the Whole to ask additional questions. Questions were raised about how the fee schedule would impact non-profits using City properties. Although there is no specific direction in the Fees and Charges Bylaw about different rates for non-profits or charities, there is a provision in the proposed schedule that states “**A separate fees and charges agreement may be created at the discretion of the Chief Administrative Officer or designate**”. This gives the City the ability to consider commercial use of its property by non-profits or charities on a case by case basis.

Benefits or Impacts



Fiscal Responsibility

- Charging businesses for their use of municipal property will allow the City to recoup some of its costs.

Policy/Legislation

This adds Schedule “I” to the Fees and Charges Bylaw.

Attachments

City of Grand Forks Fees and Charges Amendment Bylaw No. 1958-A5, 2018

Recommendation

THAT Committee of the Whole recommends to Council to give the first three readings to the “City of Grand Forks Fees and Charges Amendment Bylaw No. 1958-A5, 2018” at the May 22, 2018 Regular Meeting.

Options

1. RESOLVED THAT Committee of the Whole accepts the recommendation.
2. RESOLVED THAT Committee of the Whole does not accept the recommendation.
3. RESOLVED THAT Committee of the Whole refers the matter back to staff for further information.

THE CORPORATION OF THE CITY OF GRAND FORKS

BYLAW NO. 1958-A5

A BYLAW TO AMEND THE CITY OF GRAND FORKS FEES AND CHARGES BYLAW NO. 1958

WHEREAS the Community Charter empowers Council to acquire, accept and hold any property in the Municipality for pleasure, recreation or Community uses of the public and to make regulations governing the management, maintenance, improvement, operation, control and use of such property;

The Council of the Corporation of the City of Grand Forks **ENACTS** as follows:

1. This bylaw may be cited as the “**City of Grand Forks Fees and Charges Amendment Bylaw No. 1958-A5, 2018**”.
2. That “Fees and Charges Bylaw No. 1958, 2014” be amended as follows:
 - a. INSERT into the list of schedules in section 3.1 “I” Business Fees and Charges” in alphabetical order.
 - b. ADD “Schedule I – Business Fees and Charges” as in Appendix 1 of this bylaw.

Read a **FIRST** time this day of , 2018.

Read a **SECOND** this day of , 2018.

Read a **THIRD** time this day of , 2018.

FINALLY ADOPTED this day of , 2018.

Mayor Frank Konrad

Corporate Officer – Diane Heinrich

CERTIFICATE

I hereby certify the foregoing to be a true copy of Bylaw No. 1958-A5, as passed by the Municipal Council of the City of Grand Forks on this day of , 2018.

Corporate Officer of the Municipal Council
of the City of Grand Forks

Appendix 1

SCHEDULE "I"
BUSINESS FEES AND CHARGES

**Temporary commercial use of public
property charge**

Five percent of gross daily revenue up
to \$2000 per day

**Minimum Fee without current City of
Grand Forks business licence**

Same as business licence fee

**A separate fees and charges agreement
may be created at the discretion of the
Chief Administrative Officer or designate**