BY-LAW NO. 3012 OF THE
COUNTY OF GRANDE PRAIRIE NO. 1

A by-law of the County of Grande Prairie No. 1 in the Province of Alberta, to adopt the attached Dimsdale Area Structure Plan for all those lands contained within SW-21-71-7-W6M, SE-21-71-7-W6M, SW-22-71-7-W6M, SE-22-71-7-W6M, NW-16-71-7-W6M, NE-16-71-7-W6M, NW-15-71-7-W6M, NE-15-71-7-W6M, SW-16-71-7-W6M, SE-16-71-7-W6M, SW-15-71-7-W6M, SE-15-71-7-W6M, NW-9-71-7-W6M, NE-9-71-7-W6M, NW-10-71-7-W6M and NE-10-71-7-W6M

WHEREAS the Municipal Government Act, Statutes of Alberta, 2000, Chapter M-26. and amendments thereto, authorizes a Council to provide a framework for the subdivision and development of an area of land within the Municipality; and

WHEREAS the Council of the County of Grande Prairie No. 1 has properly notified the owners of land within the development area, pursuant to provisions of the Municipal Government Act, Statutes of Alberta, 2000, Chapter M-26, and amendments thereto.

NOW THEREFORE the Council of the County of Grande Prairie No. 1 duly assembled, hereby enacts as follows:

1. That this By-law shall be known as the **"DIMSDALE AREA STRUCTURE PLAN BY-LAW".**

2. That the Dimsdale Area Structure Plan document is attached to this by-law as an appendix and forms part of this by-law.

3. That this by-law shall take effect on the date of its final passage by Council.

READ A FIRST TIME THIS 24 **DAY OF** Nov. **,A.D.** 2014.

REEVE

COUNTY ADMINISTRATOR

READ A SECOND TIME THIS 24 **DAY OF** Nov. **, A.D.** 2014.

REEVE

COUNTY ADMINISTRATOR

READ A THIRD AND FINAL TIME AND FINALLY PASSED THIS 9TH **DAY OF** MARCH **A.D.** 2015**.**

REEVE

COUNTY ADMINISTRATOR

Dimsdale Area Structure Plan

March 12, 2015

Prepared by:

County of Grande Prairie No. 1
Alberta, Canada

DIMSDALE
AREA STRUCTURE PLAN

Prepared by

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March 12, 2015

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1.0 INTRODUCTION

1.1 Purpose of the Plan

The proposed Dimsdale ASP will provide comprehensive policy framework to guide future development in the Hamlet of Dimsdale and surrounding area. The primary purpose of this plan is to provide direction for growth in accordance with the Municipal Government Act (MGA), County Municipal Development Plan (MDP) and County Land Use Bylaw (LUB) by identifying areas for future country residential and industrial development. In addition, this plan will also analyze existing infrastructure services and provide direction to allow for efficient growth and expansion of transportation and infrastructure within the study area. Moreover, this plan intends to adhere to information contained in applicable provincial legislation, specifically the *Alberta Municipal Government Act*.

1.2 Plan Area

As shown in **Map 1 – *Location*,** the land in question is located approximately 3 miles west of the City of Grande Prairie and half a mile south of Highway 43. The proposed study area for the Dimsdale ASP is comprised of 16 quarter sections, totaling an area of 2560 acres. The plan area includes Dimsdale Lake, the Hamlet of Dimsdale, and the Juggers Landing residential subdivision. The ASP

area is bounded by Range Road 72 to the east, Range Road 74 to the west and agricultural land directly to the north and south of the study area. The CN Railway runs along Township Road 712 through the south end of the ASP area.

1.3 Enabling Legislation

The Dimsdale Area Structure Plan has been prepared in accordance with Section 633 of the Municipal Government Act (MGA) (Revised Statutes of Alberta, 2000, Chapter M-26). The MGA allows municipalities to adopt area structure plans to provide a framework for the development of an area and future subdivisions. The MGA stipulates the following:

633 (2) an area structure plan:

a) must describe

i. the sequence of development for the area,

ii. the land uses proposed for the area, either generally or with respect to specific parts of the area,

iii. the density of population proposed for the area either generally or with respect to specific parts of the area, and

iv. the general location of major transportation routes and public utilities, and

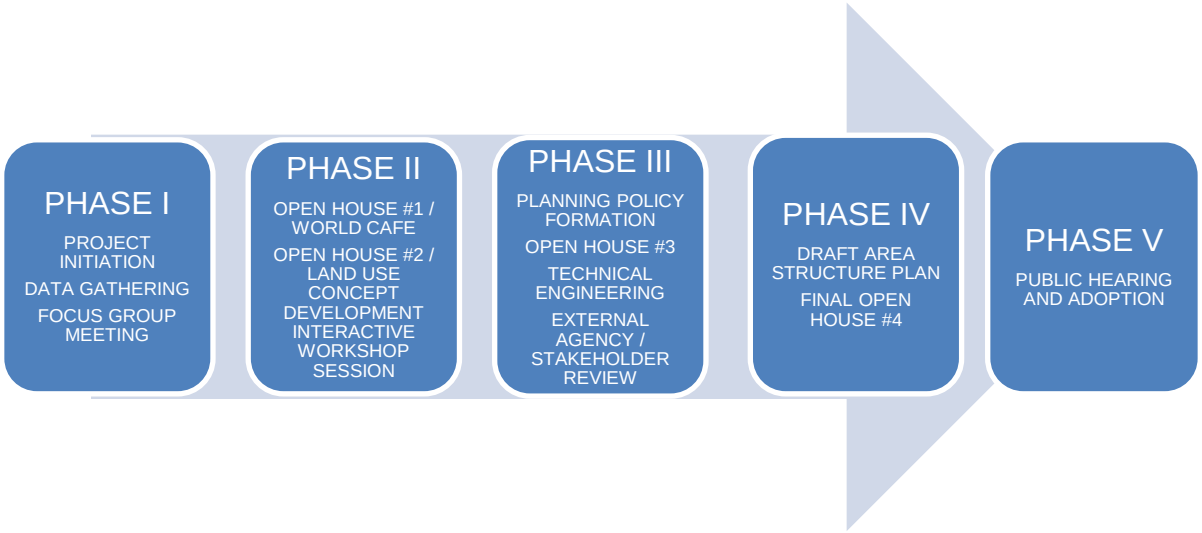
b) may contain any other matters the council considers necessary.

1.4 Planning Process

This Dimsdale ASP was prepared in five phases between **January 2012** and **November 2014.** Opportunities for stakeholder and public involvement were provided during each phase of the plan.

Refer to Appendix C – Area Structure Plan Process Flowchart for a comprehensive breakdown.

1.5 Community Consultation



Stakeholder Focus Group Meeting

Community consultation was an extremely important part of the planning process. As part of the community consultation program, landowners in the study area received project background news letters with notification of the ASP process and opportunities for involvement throughout the ASP process. The following summarizes the public consultation activities undertaken during the preparation of the ASP.

Focus Group (January 15, 2012)

A meeting was held at the County Administration Building on January 15, 2012. The Focus Group meeting was attended by the Area Councilor, members of the Planning Department and representative from the landowners in the proposed study area. The following is a summary of outcomes from the Focus Group and initial direction provided for the development of the draft Area Structure Plan:

- **Water Supply:** There is growing concern from local residents that there is an insufficient water supply for the existing development in the area. This needs to be taken into consideration for any future development.

- **Stormwater Management:** There are concerns that stormwater runoff from industrial sites in Dimsdale may affect the water quality of Dimsdale Lake. In addition, any future development may have an adverse effect on the water quality in the lake.
- **Municipal Services:** It has been identified that there needs to be consistent guidance for future development. Currently, there are no municipal services in the area: private water; sewage; water; gas; power and phone lines should be installed at the developer's expense.
- **Conflicting Land Uses:** Residents have expressed concern about the conflicting industrial and residential uses in the area. This has created problems with dust control, safety, road maintenance and noise.
- **Traffic Concerns:** Trucks are accessing the industrial sites via roads that are not suitable for this type of traffic. This leads to rapid road degradation which is cited by local resident's concern regarding safety.
- **Buffers:** Are required to mitigate the negative impact of industrial emissions, noise and odor in residential areas.
- **Zoning/Enforcement:** Lack of consistent policy has created scattered development and land use conflicts in the area. A clear direction is required to harmonize future land uses.

Open House and World Café (April 11, 2012)

On April 11, 2012 the County and Kairos Creative Solutions held an Open House and World Café discussion to present information about the Draft ASP and to gather resident and landowner feedback. The Open House was held from 5-6pm, followed by a workshop including roundtable discussions from 6-8pm. Individuals who attended the meeting had the opportunity to view display boards and ask questions regarding the Plan's Goal, Objectives, future land use concepts and potential policies to the Plan.

The World Café format was received favorably, with the majority of those in attendance able to express their current concerns of the future for the area. Over 40 people attended the Open House portion of the evening with approximately 35 participating in the workshop session.

Interactive Workshop Session (February 9, 2013)

On February 9, 2013 the County held an Interactive Workshop Session between 6-8pm consisting of a World Café format which was moderated by Kairos Creative Solutions. Workshop participants divided themselves into small groups at tables with County staff located at each table. A series of land use related questions were asked of the entire group each building on the pervious question. Residents and landowners who attended the event provided County staff with direction on suitable land use concepts in the Dimsdale study area. Approximately 20 residences participated in the Interactive Workshop Session.

Open House - Input Session (May 9, 2014)

On May 9, 2013 the County held an Open House - Input Session and presented three land use concepts. The Input Session was held between 8-10am and 6-8pm. The three land use concepts were created from direction received by attendees at the previous Open House (held on February 9, 2013). Attendees were encouraged to complete an exit survey to provide feedback and vote for

their preferred land use concept. The survey requested comments and recommendations on the location of proposed residential and industrial uses, as well as the proposed road networks and buffers. The survey results provide direction for the County to develop one refined land use concept. At the Open House, over 60 people attended either the 8-10am or 6-8pm session.

Final Open House (September 9, 2014)

On September 9, 2014 the County held the Final Open House and presented the draft ASP including; the refined land use concept and conceptual servicing plans to the public. The refined ASP Plan took into account the public's feedback from three study area concept plans presented at the previous Open House (May 9, 2013) and the results from 21 completed surveys collected at the same Open House. At the Open House on September 9, 2014 County staff provided the technical support and answered questions related to the specifics within the development of the ASP. Further input from the public was gathered and technical aspects of the plan were further refined in areas deemed necessary.

A variety of concerns from the previous open houses were addressed within the ASP, while some comments shall be dealt with at the detail design or Outline Plan stage. As such, some concerns over the open space network shown conceptually may overlap some of the existing properties, or a concern regarding the reconfiguration of the local road network; Administration foresees these concerns mediated at refined stages within the Plan.

Public Hearing
In accordance with the MGA, a Public Hearing was held on November 24, 2014 in the Council Chambers at the County of Grande Prairie No. 1 administration building in Clairmont.

1.6 Plan Organization

The Dimsdale ASP is organized as follows:

Section 1.0 *Introduction:* Provides an overview of the ASP by documenting the purpose, plan area, existing conditions, enabling legislation and public consultation activities undertaken during the ASP process.

Section 2.0 *Statutory Plan and Policy Context:* This section provides a highlight of the overarching planning policy documents and the influence on development of this ASP.

Section 3.0 *Site Context and Development Considerations:* A description of the existing site conditions including the physical environment and existing land uses.

Section 4.0 *Development Concept:* Presents the overall development concept based upon the planning principles, opportunities, constraints and public input.

Section 5.0 *Transportation:* Description of the external and internal roadway

network and road development standards for the ASP area.

Section 6.0 *Municipal Services:* Provides framework for the proposed water servicing, stormwater system, utilities and solid waste services within the ASP area.

Section 7.0 *Implementation:* Summary of the implementation actions required, including staging, subdivision and rezoning requirements, provisions for amending the plan and setting and maintaining Community Standards Targets.

2.0 STATUTORY PLAN AND POLICY CONTEXT

2.1 Alberta Land Use Framework

The purpose of the *Alberta Land-use Framework* is to manage growth and to sustain the province's growing economy, but balance it with Alberta's social and environmental goals. The *Alberta Land Use Framework* sets out an approach to manage public and private lands and natural resources to achieve long-term economic, environmental and social goals. It provides a blueprint for land-use management and decision-making that addresses Alberta's growth pressures. The *Alberta Land Use Framework* is about Smart Growth. Future land-use decisions will need to be consistent with regional plans. The *Land Use Framework* consists of seven basic strategies to improve land-use decision-making in Alberta:

Strategy 1: *Develop seven regional land use plans based on seven new land-use regions.*

Strategy 2: *Create a Land-use Secretariat and establish a Regional Advisory Council for each region.*

Strategy 3: *Cumulative effects management will be used at the regional level to manage the impacts of development on land, water and air.*

Strategy 4*:* *Develop a strategy for conservation and stewardship on private and public lands.*

Strategy 5: *Promote efficient use of land to reduce the footprint of human activities on Alberta's landscape.*

Strategy 6: *Establish an information, monitoring and knowledge system to contribute to continuous improvement of land-use planning and decision-making.*

Strategy 7: *Inclusion of aboriginal people in land-use planning.*

The County of Grande Prairie, including the Hamlet of Dimsdale, is part of the Upper Peace Regional Plan. This plan has not yet been developed.

2.2 Intermunicipal Development Plan, Bylaw No. 2896

The Intermunicipal Development Plan (IDP) outlines some of the regional infrastructure improvements required to benefit residents of The City of Grande Prairie and the County of Grande Prairie No. 1 However, as the Plan area is located outside the IDP referral area, The City of Grande Prairie is not required to be involved in the ASP process.

2.3 County of Grande Prairie No. 1 Municipal Development Plan, Bylaw No. 2360

The County of Grande Prairie No. 1. Municipal Development Plan (MDP), Bylaw 2360 was adopted and amended in 1998. Since the Municipal Government Act requires that all statutory plans be consistent with one another, it is important to understand the policy direction outlined in the MDP to ensure that the Dimsdale ASP is in compliance.

The County MDP provides the general policy framework with which more detailed plans are required to be consistent. Section 13.5 of the Plan indicates that area structure plans are required as a prerequisite for the development of industrial parks, hamlets, high commercial subdivisions, "or any other major development where such a plan would assist the County in making planning decisions." The County MDP identifies the future land uses located in the Dimsdale Study Area as a mix of country residential, industrial and natural area uses**.** The development of this ASP is consistent with the policy framework of the MDP and careful consideration with regards to Section 7 (Residential Development) and Section 8 (Industrial Development).

3.0 SITE CONTEXT AND DEVELOPMENT CONSIDERATIONS

3.1 Topography and Natural Features

As shown in **Map 2 – *Topography,*** the ASP area has a terrain that generally slopes from the north boundary of the study area towards the Dimsdale Lake and Spring Creek, while land south of these water bodies slopes towards the south boundary of the study area. The Dimsdale Study Area has an elevation change that varies approximately 47 meters where the sites highest point is located in the northeast corner. The Lake is the most prominent natural amenity within the ASP area. It encompasses 63.3 ha (157.0 acres) in the middle of the study area and is visible from most of the site due to the change in elevation.

The majority of the proposed development is currently used for agricultural purposes with rolling hills. The remaining portion of the site is developed as industrial and single family lots, concentrated in the existing Hamlet of Dimsdale to the southeast of Dimsdale Lake. A majority of the agricultural land is classified as prime agricultural, therefore most of the land has been cleared and has the

potential for development with the exception of several low lying areas which have been identified as drainage channels throughout the study area which diverts stormwater into Dimsdale Lake.

3.2 Land Ownership

The ASP area encompasses approximately 1036 hectares (2560 acres) of land and is comprised of 16 quarter sections;

SW-21-71-7-W6M,	SE-21-71-7-W6M,	SW-22-71-7-W6M,	SE-22-71-7-W6M
NW-16-71-7-W6M,	NE-16-71-7-W6M,	NW-15-71-7-W6M,	NE-15-71-7-W6M
SW-16-71-7-W6M,	SE-16-71-7-W6M,	SW-15-71-7-W6M,	SE-15-71-7-W6M
NW-9-71-7-W6M,	NE-9-71-7-W6M,	NW-10-71-7-W6M,	NE-10-71-7-W6M

The majority of the lands within the ASP area are privately owned and currently being used for agricultural, county residential and industrial purposes. Within the Hamlet of Dimsdale, the majority of land is classified as residential industrial while industrial areas are concentrated along Range Road 72A and Township Road 712. The majority of country residential districts outside the Hamlet are primarily located west of Dimsdale Lake within Juggers Landing; a residential subdivision located along Township Road 713 and east of Range Road 72A. The reminder and majority of lands within the ASP area is allocated as agricultural lands.

Refer to **Appendix A - Dimsdale Land Ownership Information** (revised at the time this ASP was finalized).

3.3 Existing Land Use and Zoning

Existing Land Uses and Districts are shown on **Map 3 – *Existing Land Uses***. The predominant land use in the ASP area is currently agricultural operations. The majority of uses within the Hamlet consist of Country Industrial (CM) with Rural Light Industrial (RM-1), Rural Medium Industrial (RM-2) and one Limited Intuitional and Recreation (L-IR) lot along Range Road 72A.

The most dominant residential use outside the existing Hamlet is Country Residential (CR-5) Districts and is distributed throughout the study area while a majority of this county residential (CR-5) lots are located in Juggers Landing Subdivision and along Township 713. Rural Medium Industrial (RM-2) is located along Range Road 72A and Township Road 712. In addition, one Country Residential (CR-4) District and one Farmstead (AG) District is located within the study area.

The majority of the ASP is currently zoned as Agricultural (AG) District, which allows for extensive agricultural operations and a variety of uses associated with agricultural uses on a discretionary basis.

Country Residential (CR-5) Districts allow for country residential subdivisions with a Major Home Occupation associated with the principal residential use. Discretionary Uses associated to country residential districts also include parks, public uses, Minor Home Occupation and a variety of single family housing types including manufactured homes and modular homes.

The industrial districts along Range Road 72A and Township Road 712 provide sites for industries and businesses that require large open storage areas that are not considered hazardous, but may create a nuisance by way of appearance, noise or smell. This type of industrial use is encouraged within the Plan in areas identified for industrial uses.

The majority of residential districts within the Hamlet are Country Industrial (CM) and are intended to accommodate a residential dwelling as a required use with a small industrial / business use that cannot be defined as a Major Home Occupation, although not large enough to operate on an industrial lot.

4.0 DEVELOPMENT CONCEPT

4.1 Overview

The future development concept for the Dimsdale ASP is shown on **Map 4 – *Development Concept***. This is a conceptual land use framework, and the land use areas generalized and are only approximate. The intent of this plan is to provide a generalized land use plan with conceptual lot layout that will be subject to further refinement at the time of subdivision and survey. A detailed breakdown of proposed land uses in the area is provided in **Table 1 - *Land Use Statistics*.**

The Development Concept is based upon public input from the Dimsdale Open Houses, planning principles, opportunities and constraints and assisted in the development of the Dimsdale ASP's Goal, Objectives and Policies.

Goal:
To develop Dimsdale as a mixed community that meets the needs of its residents locally, fosters employment, and maintains a country residential living environment.

Objectives:

- **Arrange a mix of land uses in a mutually complementary fashion that creates a safe environment and reduces land use conflicts.**

- **Create a mix of lot sizes to promote a range of dwelling types and in turn creates a variety of housing options.**

- **Provide a range of industrial types to address the needs of various users.**
- **Protect & preserve the Dimsdale Lake for the use of the public.**
- **Provide a hierarchy of roads including arterials, collectors and local roadways to ensure safe, efficient vehicular access.**
- **Ensure municipal water to all development is provided at the time servicing is available.**
- **Maintain the ASP as a current planning tool, updating it through an orderly review and amendment process.**

4.2 Residential Policies

4.2.1 Country Residential (CR) Districts

As noted in **Table 1 – Land Use Statistics**, approximately **159.0 ha (393.0 ac)** of the Plan area is to be developed for residential purposes. A mixture of Country Residential CR-3 and CR-5 Districts are proposed throughout the Study Area. Applications for country residential and public uses will be directed to the lands designated as country residential on **Map 4 – *Development Concept***, as per the land use framework of the plan.

4.2.2 A majority of the country residential development is proposed within the northeast portion of the Plan area, as well as various multi lot residential subdivisions along Range Road 72 and Range Road 74.

4.2.3 All proposed residential uses within the Plan area will consist of country residential, providing a residential characteristic similar to the majority of multi-lot country residential subdivisions throughout the County.

4.2.4 Residential areas within the Plan will be developed as low density with permitting uses consisting of single detached dwelling units and discretionary uses consisting of manufactured homes and mobile homes.

4.2.5 Country Residential (CR-5) Districts are proposed to be strategically located in close proximity to existing road networks and will expand onto newly constructed roads as road construction is deemed necessary.

4.2.6 The Country Residential (CR-5) District allows for Major Home Occupations as a discretionary use. Major Home Occupations is not permitted in the CR-3 District. The proposed CR-3 and CR-5 Districts will be located away from each other to reduce land use conflicts between residents with major home occupation and Country Residential (CR-3) Districts.

4.2.7 Country Industrial (CM) Districts

Country Industrial development totaling approximately **22 ha (55 ac)** is established within the existing Hamlet at part of SW-15-71-07-W6M. In country industrial districts, small businesses that cannot be defined as Major Home Occupations which are not large enough to operate in a Rural Industrial District may operate among other similar businesses within a Country Residential setting. This District is intended to accommodate a residential dwelling, while the industrial use does not overshadow the residential dwelling as the primary function.

4.2.8 No further subdivisions for Country Industrial (CM) Districts are proposed within the study area.

4.2.9 The County Land Use Bylaw will allow the existing country industrial districts to continue their operations while the County promotes a community driven COMMUNITY STANDARDS Committee to ensure all districts follow and Maintain higher level of standards and targets (refer to Section 7.9.2 Setting and Maintaining Community Standards and Targets). Refer to ***Appendix A – Summary of Recommendations – Community Standards Bylaw.***

4.3 Industrial Policies

4.3.1 Industrial (RM) Districts

As noted in **Table 1 – Land Use Statistics**, approximately **341.1 ha (843.0 ac)** of the Plan area is to be developed for industrial purposes. A mixture of light, medium and highway industrial development is proposed; the location of which is intended to concentrate in close proximity to Range Road 72A and Township Road 712 to minimize the potential for land use conflicts with residential properties. Applications for industrial uses will be directed to the lands designated as industrial uses on **Map 4 – *Development Concept***, as per the land use framework of the plan.

4.3.2 Given the proximity of future industrial development to established country residential uses in the Plan area, no industrial uses will be permitted that creates off-site nuisance effects such as odors, emissions, or excessive noise. As such, in order to ensure an orderly transition from highway industrial and medium industrial with adjacent country residential development, light industrial development is proposed for the central portion of part of SE-22-71-07-W6M & NE-15-71-07-W6M.

4.3.3 Highway industrial and light industrial development is proposed in the north east portion of the Plan area; a majority of medium industrial is proposed to be located between Township Road 712 and the south boundary of the Study Area

4.3.4 All future industrial along Dimsdale Road (Range Road 72A) is proposed as Highway Industrial (RM-4) Districts to create an aesthetically pleasing corridor as the road is the access into the Hamlet of Dimsdale. Highway industrial lots shall conform to the County Land Use Bylaw (Section 26) as such landscaping along the highway is a critical element in this district.

4.3.5 Uses encouraged in the medium industrial area are those that are characteristic of rural industrial parks in the County, and would be administered under the Rural Medium Industrial (RM-2) District under Section 24 the Land Use Bylaw.

4.3.6 All industrial development in the Plan area shall be the subject to a high quality level of design and landscaping in accordance with County requirements. This is a result of the high degree of visibility that these locations afford, as well as their close proximity to residential development. All industrial sites shall be fenced, and screened with landscaping to the satisfaction of the County.

4.3.7 The types of industrial uses that may be supported in the Plan area include fenced outdoor storage yards, warehousing, contracting services, construction yards, oilfield support services and trucking operations.

4.4 Environmental Policies

4.4.1 Environment and Open Space

A network of interconnected open space adds livability and sustainability around Dimsdale Lake. Over time the plan is to improve the environmental quality of the Lake by preserving riparian areas between proposed development and the Lake's high-water mark.

4.4.2 No development shall be permitted within the 1:100 year floodplain of Dimsdale Lake, and buffers of natural vegetation shall be maintained along drainage courses.

4.5.3 Dimsdale Lake is an important Trumpeter Swan breeding water body; these swans are highly sensitive to disturbance, and small disturbances can lead to large cumulative impacts in terms of productivity on the lake. The existing shrub and forest vegetation adjacent Dimsdale Lake offers an opportunity to mitigate the negative impacts of swans and clearing of vegetation adjacent to the lake should be avoided. Therefore, a minimum of 30 meters setback from marsh vegetation adjacent to Dimsdale Lake must be maintained while appropriate setback distance could be greater due to slope stability or other factors at these locations.

4.5.4 Buffers around Oil and Gas Installations

Setbacks and buffers around oil and gas installations have been provided in accordance with Alberta Energy Regulars (AER) regulations and recommendations. The requirement for setbacks and buffers are as follows:

A) A minimum setback distance of 100 meters for active and suspended wells from residential development.
B) Right-of-way has been applied to all pipelines in the ASP area where no development is permitted.

4.5.5 Buffers between industrial and residential development

In order to protect proposed residential development from the effect of adjacent industrial sites, landscaped buffers and berming shall be provided in accordance with County requirements. Such measures are to be accommodated as outlined in **Map 4 – *Development Concept***.

4.5.6 Municipal Reserve

At the time of subdivision, up to 10% of all area developed shall be dedicated as Municipal Reserve (MR) in accordance with the MGA. MR may be acceptable as cash-in-lieu or deferment of the reserve to the balance of the section at the discretion of the County.

4.5.7 Environmental Reserve

At the time of subdivision, any land containing environmentally sensitive features shall be dedicated as Environmental Reserve (ER) in accordance with the provisions of the MGA. The existing vegetation and riparian area along the Dimsdale Lake and Spring Creek shall be maintained to ensure continued habitat function and avoid degradation of the Lake's Ecosystem.

Table 1 – Land Use Statistics

	Acres	Hectares	Percent Of GDA
Total Area Structure Plan Area	2596.0	1051.0	100.0%
Dimsdale Lake	157.3	63.7	6.1%
Total Development Area	658.8	246.6	23.4%
Net Developable Area	1779.9	740.7	70.5%
Residential	460.8	186.7	17.7%
Country Residential (CR-2) District	286.4	116.0	11.0%
Country Residential (CR-5) District	174.5	70.7	6.7%
Industrial	722. 8	312.8	29.8%
Rural Light Industrial (RM-1) District	89.2	36.1	3.4%
Rural Medium Industrial (RM-2) District	586.2	237.3	22.6%
Highway Industrial (RM-4) District	97.4	39.4	3.8%
Proposed Right-of-way	383.4	155.2	14.8%
Municipal & Environmental Reserve	212.4	86.0	8.2%

5.0 TRANSPORTATION

5.1 Overview

Primary access to the existing Hamlet is currently obtained from Highway 43 onto Range Road 72A (Dimsdale Road). Secondary access to the existing Hamlet is provided by Township Road 712. Access into Juggers Landing Subdivision is acquired from Highway 43 onto Range Road 74.

5.2 Future Interchange and Intersections along Highway 43

It is anticipated that Alberta Transportation will construct an interchange along Highway 43 outside the boundaries of the Study Area on Sections NW-21-71-7-W6M & NE-21-71-7-W6M. While Alberta Transportation has committed to constructing an interchange in the general area, Alberta Transportation has not finalized or adopted a plan at the time the Dimsdale ASP was finalized. In addition, as part of the construction of the proposed Highway 43 interchange, it is the intent of Alberta Transportation to close the Highway 43 intersections along Range Road 72A and Range Road

74. Alberta Transportation has not committed to any timeframe on the construction of the proposed interchange or the intersection road closures; as such the Dimsdale ASP has not contemplated the connection to the proposed interchange or the intersection closures at this time. The County may choose to indicate the interchange as a major traffic route into the Study Area through an amendment of the Plan following the adoption of the proposed interchange with Alberta Transportation.

Should the County choose to amend the Plan and indicate the interchange as a major road network into the Study Area, the County may choose to identify suitable land use patterns adjacent to the proposed interchange (*refer to Section 7.11 – Amending the Plan*).

5.3 Regional Transportation Network

As illustrated **Map 5 – *Proposed Regional Transportation Network,*** the proposed regional transportation network for the areas surrounding the ASP area. As mentioned in the above Section 5.2, should future intersection road closures along Highway 43 occur, it is anticipated that the primary traffic volume into the study area will flow east to west while secondary traffic volume will move north to south. It is likely that a provincial highway will be constructed from Highway 43X West along the southwest side of the City of Grande Prairie and connect to Highway 40. This proposed highway has been identified as Highway 43X Resource Road. Following the construction of the proposed Highway 43X Resource Road, upgrades to Township Road 712 connecting the Study Area to Highway 43X Resource Road shall follow. Similarly in the future, at the time Alberta Transportation constructs the proposed interchange along Highway 43, upgrades to Township 713A through the study area to the proposed Highway 43X Resource Road are anticipated to follow. Both Township 712 and 713A upgrades will provide primary access routes east to west into the Study Area and connect onto Highway 43X West, into the City of Grande Prairie and onto Highway 2 North. In the future, as Township Road 712 and 713A require upgrades; they shall be constructed to an arterial standard. Furthermore, it is anticipated that additional road right-of –way will be required to accommodate the necessary arterial roadway widening.

5.4 Internal Transportation Network

As illustrated **Map 6 - *Proposed Internal Transportation Network,*** identifies the proposed roadway network access area within the ASP. Collector roadways are described through the ASP area, providing a connection to the arterial road network being Township Road 712 and 713A. Upgrading of the existing road system that carries traffic from Highway 43 into the existing Hamlet of Dimsdale along Range Road 72A (Dimsdale Road) will need to be done to accommodate the increase of future traffic flows. Future upgrading of the east and west perimeters of the Study Area (along Range Road 72 and 74) and along Range Road 72A to a Collector Standard will be required. It is anticipated that additional road right-of–way will be required to accommodate the necessary collector roadway widening and will occur as development occurs.

A local roadway system is described in the Plan Area to provide access to individual parcels. It is encouraged to utilize existing right-of-ways and existing road infrastructure to support local traffic. Additional right-of-ways and local roads will be require to provide access to individual parcels and

will occur as development ensues. It is encouraged to design roadway loop systems to minimize traffic congestion in the Study Area, while incorporating cul-du-sac roadways where loop systems are not suitable. Parking along local roadways will be dependent on traffic volumes associated with adjacent land uses and development types.

6.0 MUNICIPAL SERVICES

6.1 Overview

An analysis of the water servicing and stormwater servicing requirements for the Study Area was conducted in accordance with Aquatera and County standards in place at the time of the Plan's adoption. Much of the design work is conceptual, while more detailed engineering is required as part of any development review and approval process; this is best accomplished by providing water design reports that cover an area of approximately one quarter section in size. Additionally, a design report must be provided to Aquatera in advance of the first phase of subdivision development which includes water servicing. The conceptual watermain network layout is identified in **Map 7 – *Conceptual Water Servicing Plan***, which sets the framework that is needed to provide an acceptable level of services for both domestic pressures and fire flows**.** A conceptual watermain network layout has been provided by WSP Canada Inc - Sherwood Park Office and included as **Appendix D.**

In addition, the design of a stormwater management system was done in accordance with the County of Grande Prairie No. 1 Minimum Design Standards 2003, Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems March 2013, and Stormwater Management Guidelines for the Province of Alberta. ***Map 8 – Conceptual Stormwater Servicing***

Plan, is undertaken for the purpose of identifying courses of action to develop and implement a Best Practices approach. The full Stormwater Management Report, Flow Management and Quality Management & Construction Activities for the Dimsdale area has been provided by WSP Canada Inc - Sherwood Park Office and included as **Appendix E.**

6.2 Water Distribution

No municipal water service is currently available within the Plan area or the immediate vicinity at the time this ASP was finalized. In the short term, individual lots will be serviced by private onsite potable water. While it has been assumed that a new dedicated water supply main will be constructed, to support the Dimsdale study area. Three water supply options (based on the timing of the development within the Dimsdale study area) may be investigated which include;

1. Connect to a future transmission line that will extend from The City of Grande Prairie to the Town of Wembley.
2. Connect to the Airport reservoir once the dedicated fill line is complete.
3. Provide a trickle feed system to the development within the Dimsdale study area

Map 7 – Conceptual Water Servicing Plan indicates the potential alignment and servicing concepts for the area. Detailed engineering studies will need to be undertaken to determine the feasibility of conceptual water servicing; including the required size of the supply line, the necessary pumping requirements, the proposed connection point to The City of Grande Prairie and other related appurtenances.

The Dimsdale site has an elevation change that varies between approximately 677m to 724m, where the elevation generally falls from north to south. As such, it is proposed that an at-grade reservoir is constructed at the apex of the area, which is essentially in the northeast corner of the site. Additionally, to provide adequate water to lots along the north boundary of the study area, a booster pump has been recommended.

The proposed water network provides an acceptable level of services for both domestic pressures and fire flows. An at-grade reservoir, booster pump station, and a new dedicated supply main (constructed at the developers expense), will be required to support the proposed and existing development. Based on the calculated average daily demand for the existing Hamlet and Study Area, the required flow exceeds what is available from Aquatera by approximately 5 million liters per day once the study area is fully developed. It is estimated a dedicated 450mm supply main will be required to service Dimsdale once the area is fully developed. The final sizing of the supply main will be part of a larger study including consideration of servicing lands beyond Dimsdale. The proposed size of piping is conceptual at the Area Structure Plan and subject to change, as such modifying the proposed piping size, appurtenances or scope of the servcing study area will not require an amendment to the Dimsdale Area Structure Plan.

6.2.1 Individual lots within the Study Area will supply a sufficient onsite potable water supply suitable for the development's use.

6.2.2 Should development pressures warrant the contemplation of municipal water into the Study Area, it is anticipated the development of such services would be at the cost of the developer.

6.2.3 A design report shall be provided to Aquatera in advance of subdivision development that includes water servicing.

6.2.4 Prior to multi-lot subdivision on quarter section taking place, (and prior to municipal water services being provided) water well testing will be provided to demonstrate that current water supplies are sufficient to accommodate the proposed development. Environment and Sustainable Recourse Development (ESRD) requests a copy of the water testing report to assess the impact, if any, on the water level of Dimsdale Lake and Spring Creek. In the event that water supplies are insufficient to accommodate the proposed densities, the density maybe reduced, or a caveat may be registered on the proposed lot(s) limiting water supply sources to future subdivisions.

6.3 Stormwater Management

Map 8 – *Conceptual Stormwater Servicing Plan* indicates conceptually the location of the stormwater management facilities and their integration into the ASP area. All development must conform to the County of Grande Prairie No. 1 and Alberta Environment *Design and Construction Specifications and Standards*.

Approximately half of the area drains to Dimsdale Lake and Spring Creek, with the remainder draining overland beyond the south boundary of the Study Area. The proposed layout of the stormwater system is based on the contour information available and existing lot layout. An average slope of 1-2% is assumed for all lot grading. Furthermore, it is anticipated that all lots will be graded towards roadside ditches that will convey stormwater to detention facilities followed by downstream watercourses. Where possible, existing natural watercourses that feed into Dimsdale Lake have been maintained. Any drainage courses not contained within road rights-of-way will be secured as Public Utility Lots (PUL) or easements. All existing wetlands and natural water courses within the Plan Area are water bodies under the Water Act, and activities such as excavation or infilling wetlands require authorization from Environment Sustainable Recourse Development (ESRD). Prior to subdivision, engineered design drawings shall be submitted for review to assure the integrity for the water body is not compromised. If a solution to protect the water body is not obtainable, an environment reserve may be applied to protect such water bodies. Developers are encouraged to refer to Alberta's Wetland Policy to be in compliance with the Water Act. Additionally, the proposed layout incorporates low impact development solutions consistent with Best Management Practices outlined by the Alberta Environment Protection guidelines.

The Conceptual development of the site incorporates both a minor and major storm drainage system. The layout and sizing of the minor system will be completed during the detailed design and undertaken during the process of subdivision. The major drainage network has been proposed to convey stormwater from sub-catchments to the stormwater detention ponds to detain a 1:100 year rain fall event as indicated on **Map 8 – *Conceptual Stormwater Servicing Plan,*** and all water

entering the existing watercourses and Dimsdale Lake shall be of equal or better quality then the water entering the Lake at pre-development stages.

The following measures are to be implemented to ensure that surface runoff is controlled to pre-development rates, and to minimize the potential for contaminants to be discharged into Dimsdale Lake, Spring Creek and southward of the Study Area.

6.3.1 Erosion protection measures should be considered in roadway ditches depending on the contributing catchment areas. Detailed analysis of the susceptibility of erosion occurring should be considered at the detailed design stage.

6.3.2 Stormwater run-off from the roads will be treated and controlled in roadside and grassed swale systems. The effectiveness of grassed swales in handling water quality and quantity is discussed in the Alberta Environment Stormwater Management Guidelines.

6.3.3 Storm water ponds shall be designed so that no excess sediment or deleterious substances are able to enter the natural water bodies and water courses.

6.3.4 Any drainage courses not contained within road rights-of-way will be secured as Public Utility Lots (PUL) or easements.

6.3.5 In order to provide stormwater retention and provide sources for fire protection, a series of fire ponds will be created as required and will be incorporated into the drainage course to sustain sufficient water volumes. The specific size and location of these ponds will be determined at the time of subdivision. All ponds will require proper design to prevent any contaminants reaching Dimsdale Lake. Further, on-site stormwater retention may be required (as an onsite stormwater management system / structure) on industrial sites as an additional measure to ensure that contaminated runoff is contained.

6.3.6 Where deemed appropriate or necessary, the stormwater management system / structure may be supplemented by on-site stormwater management measures on individual lots, accompanied by full engineering designs and reports.

6.3.7 A stormwater management plan for the entire area may be requested by the County if any future development or subdivision would result in significant changes to the drainage patterns contemplated by this Plan.

6.4 Lot Grading

A lot grading plan will be prepared by the Developer in accordance with County standards, with the intent that all future building projects conform to each submitted grading plan. The grading plan is intended to ensure that surface drainage from all lots is directed to roadside ditches and storm detention ponds as provided in Section 6.2 – Stormwater Management and to ensure that all new construction proceeds in a manner consistent with that intent.

6.5 Shallow Utilities

All shallow utilities (natural gas, power, telephone) are to be extended into the Plan area by the individual franchise holders as require, at the developer's expense and prior to final endorsement of subdivision. Shallow utilities may be located outside road rights-of-way in easements registered in the name of the County of Grande Prairie No. 1.

6.6 Solid Waste

At the time the Plan was finalized, the County of Grande Prairie has not contemplated a local solid waste disposal facility within the ASP area. The nearest waste management facility is the Clairmont Centre for Recycling and Waste Disposal, located approximately 8.5 miles northeast of the Plan area, in the Hamlet of Clairmont. Local residents may consider contracting private hauling services to meet their waste disposal needs. In addition, the County would not support the disposal of effluent (treated or untreated) into natural water bodies within the Plan Area at any time. Therefore, all Development must compile with the current Alberta Private Systems Standard of Practice.

7.0 IMPLEMENTATION

7.1 Overview

The Dimsdale ASP will provide the necessary framework for County Council, County Staff, local landowners, developers, other agencies and the community at large regarding decisions for future growth and development within the Dimsdale Study Area and surrounding area. The ASP will be implemented through a variety of statutory and non-statutory planning tools available to the County consistent with provisions of the MGA.

Decisions with respect to planning approvals should align with the Dimsdale ASP's Goal, Objectives and Policies. Stakeholders and public involvement is essential to the success of this Plan and in future planning and development processes as specific lands are rezoned and supporting infrastructure is designed and developed.

7.2 Staging

Staging of development within the ASP area should proceed in a logical manner generally based upon the economic, existing road networks and the orderly expansion of roadways and municipal servicing. **Map 10 – *Phasing,*** illustrates the general direction of infrastructure and development

expansion based solely upon engineering principles. This may change over time depending on such factors as market conditions, developer aspirations, external agency constraints, financing, capacity for offsite levies, and municipal growth policies.

In addition, it is anticipated an increase in country residential development is likely to occur within sections SE-22-71-7-W6M, NW-15-71-7-W6M & SE-15-71-7-W6M as upgrades to Township Road 712 and 713A occur as mentioned in Section 6.3 – Regional Transportation Network. Further, the upgrades to collector roads and the construction of local roads will follow as development within these areas occur and connect to Township 712 and Township 713A.

7.3 Outline Plan

At the request of the County, the developer may be required to submit an Outline Plan to the County for approval along with amendments to the Land Use Bylaw and subdivision applications. An outline plan (if requested) is intended to address land use and servicing at a greater level of detail than the Dimsdale ASP. Outline plans may need to address the follow:

1. A statement of compliance with all applied statutory documents such as the Municipal Development Plan and this Area Structure Plan and should identify any amendment(s) required, if applicable;
2. A description of existing land uses and physical features including vegetation, water courses and topographic information with a threshold of 1 meter contours;
3. The identification of environmentally sensitive features with measurements for their protection;
4. Any technical studies required by the County;
5. Clearly show site areas with information related to existing zoning as provided under the Land Use Bylaw and proposed land use rezoning ;
6. Land use statistics table for the Outline ASP area;
7. The location of all municipal reserves, pathways consistent with the Dimsdale ASP;
8. Arterial, collector and local road alignments and sizes;
9. A servicing brief describing proposed stormwater, and water distribution facilities, alignments and locations;
10. Surface drainage patterns, stormwater management facilities and outfall locations;
11. Public utility lots and easement locations;
12. Details of landscaped buffers for noise attention measures in close proximity to residential development, if applicable;
13. Develop staging plan based on the logical extension of roadways and utilities; and
14. Any other variety of matters the County staff deems as necessary.

7.4 Technical Studies

Developers may be required to complete technical studies by qualified professionals to demonstrate the land in question is suitable for the proposed development. Examples of these studies may include Environmental Site Assessments (ESA); Geotechnical Investigations; Traffic Impact Assessments (TIA).

7.5 Land Use Bylaw Amendments

Developers shall be responsible for applications to amend the County Land Use Bylaw within the boundaries of the ASP to rezone land to the appropriate land use district prior to subdivision.

7.6 Subdivision Approval

Developers will be required to submit and obtain approvals for a Tentative Plan of Subdivision consistent with the requirements of the *Municipal Government Act*, *Subdivision and Development Regulation*, and County policies and procedures. For this purpose:

a. All developers shall be required to enter into servicing agreements with the County as a condition of subdivision approval. The matters to be included in these agreements will include but not be limited to the provision of roads and municipal services, and the payment of off-site levies;

b. Detailed engineering drawings and specifications of roads, municipal water and stormwater drainage shall be prepared by the developer and approved by the County prior to subdivision approval on the subject lands;

c. Where municipal infrastructure is developed that provides a benefit to lands outside the development area, the County will assist in collecting a portion of the costs of the infrastructure from the said lands that benefit from the infrastructure at the time the lands that benefit initiate subdivision or development activities; and

d. All levies identified in this Plan shall be collected at the time of subdivision, at the request of the County.

7.7 Servicing Agreements

Servicing agreements will be required between the County and the developer as a condition of most subdivision approvals in accordance with Section 655 of the MGA. Detailed engineered design drawings to confirm the design of the infrastructure consistent with County standards will be required. On-site and off-site costs associated with new development of roadways and

infrastructure will be borne by the developers through development charges and levies in accordance with specific development agreements.

7.8 Amending the Plan

An amendment to the ASP shall be required if any of the following occur:

- A change in the general land use pattern of an area in conjunction with future adjacent Area Structure Plans or Outline Plans;
- Significant changes to the location of major utility networks, water distribution systems or stormwater management.
- The elimination, reclassification, or significant realignment of existing Township Roads or Range Roads servicing the Dimsdale Plan Area or establishing a road network connection with Highway 43 or
- A readjustment of the Study Area boundaries *.

*As mentioned in Section 5.3 - Regional Transportation Network; it is premature (when this Plan was finalized), to designate such land use patterns adjacent the proposed interchange as Alberta Transportation has only indicated the general location of the proposed interchange. Should Alberta Transportation adopt the proposed plan, the exact location of the interchange will be identified and the County may choose to amend this Plan to change the boundaries and therefore increase the Study Area. Furthermore, an amended Plan could identify suitable land use patterns adjacent the proposed Highway 43 Interchange.

7.9 Setting and Maintaining Community Standards Targets

7.9.1 County Council may adopt a bylaw in conduction with the Dimsdale ASP Community Standards Bylaw. A Community Standards Bylaws would set standards with the goals to improve the municipality's appearance as in conjunction with the County's Unsightly Premises Bylaw (Bylaw NO. 2509) and Noise Bylaw (Bylaw NO. 1964) County Council should consider establishing a Community Standards Bylaw to aid in the enforcement of unsightly premises and nuisance properties in the County.

8.0 REFERENCES

WSP Canada Inc. Sherwood Park – *Water Network Analysis - Dimsdale AB – Revision 2, February, 2015.*

WSP Canada Inc. Sherwood Park – *Stormwater Management Report - Dimsdale AB* – Revision 1, February, 2015.

Province of Alberta, *Alberta Wetland Policy*, Environment and Sustainable Resource Development, 2013.

Province of Alberta, *Land Use Framework,* December 2008.

McElhanney Consulting Services Ltd., *Highway 2 and 43 Transportation/Access Study,* November 2004.

County of Grande Prairie No. 1, *Minimum Design Standards,* 2003.

County of Grande Prairie No. 1, *Land Use Bylaw No. 2680,* June 2003.

Province of Alberta, *Water Act,* Environment and Sustainable Resource Development, 2000.

Province of Alberta, *Alberta Environment Stormwater Management Guidelines*, 1999.

County of Grande Prairie No. 1, *Municipal Development Plan No. 2360,* April 1998.

9.0 GLOSSARY OF TERMS

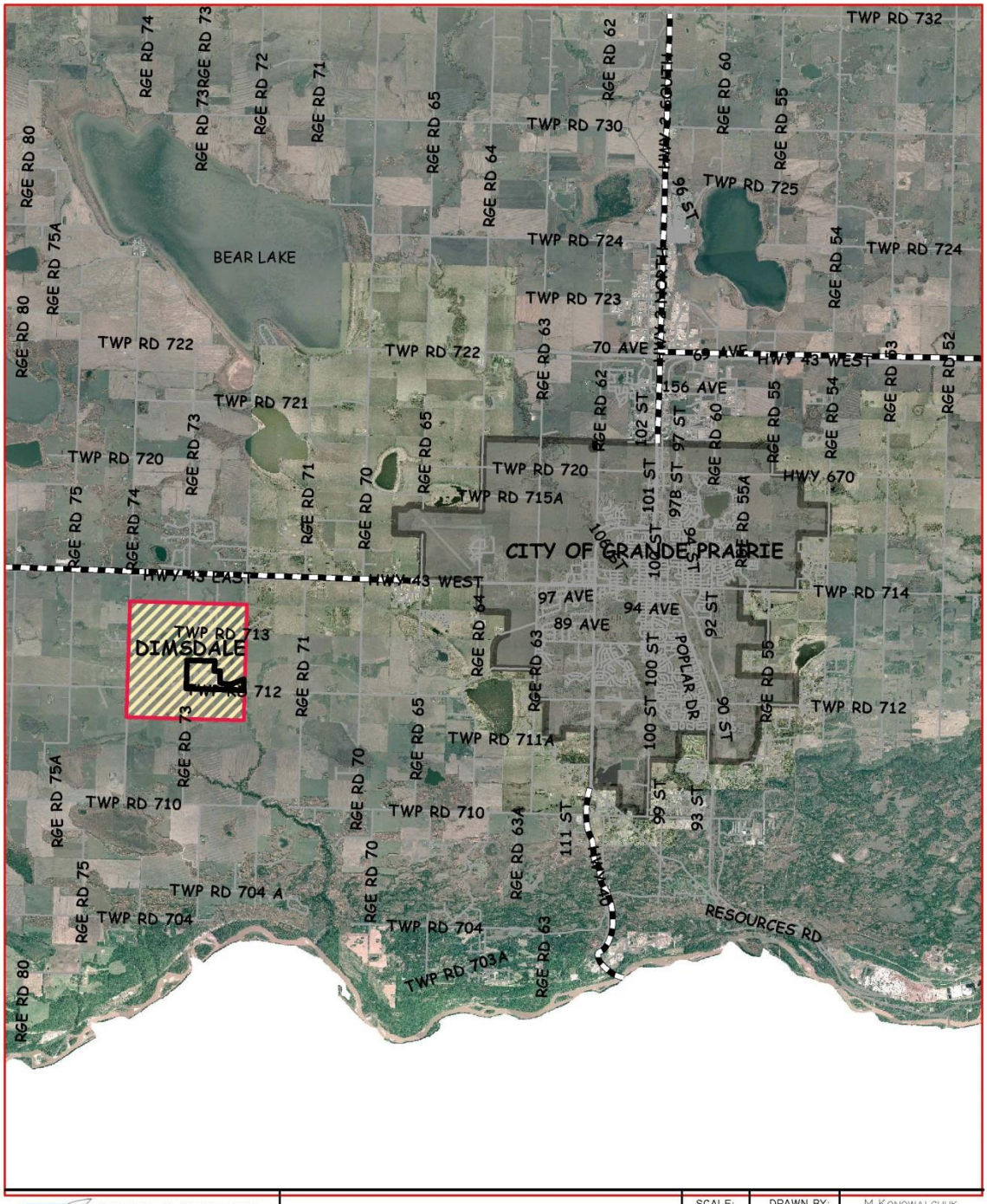
Buffer	An area where development is restricted to a row of trees, shrubs, berming, fencing, or other similar means to provide visual screening and separation between sites, incompatible land uses, roadways or districts.
Country Industrial District	This District is to provide an opportunity for small businesses that cannot be defined as Home Occupations, yet are not ready or large enough to operate in a standard Industrial District, to operate in a Country Residential setting among other similar businesses. This District is intended to accommodate a residential dwelling as the primary function and a required use with any permitted or approved discretionary industrial use.
Country Residential District	In the case of a subdivision; a parcel of land utilized for residential purposes which is not otherwise described in this bylaw and in the case of dwelling unit; a single detached dwelling or manufactured home except a farmstead which is situated on the country residential subdivision.
Discretionary Use	The use of land or of a building that is listed in the columns captioned "Discretionary Uses" in all districts in this Bylaw, and for which, subject to the provisions of this Bylaw a development permit may be issued.
Environmental Impact Assessment	A comprehensive site analysis to determine: (a) the potential impact of the proposed development on site; (b) the potential environmental impact of the proposed development upon adjacent properties or land uses; and (c) the potential environmental impact of the proposed development upon the future land use potential of the property.
Environmental Reserve	Created by a plan of subdivision, as required under the Municipal Government Act, which is not suitable for development because of slope instability, groundwater, steep valley banks, flooding, soil conditions, pollution concerns, etc. Environmental reserves may consist of a swamp, gully, ravine, coulee or natural drainage course, or a strip of land abutting the bed and shore of any lake, river, stream or other body of water in order to provide public access.
Minor, Home Occupation	A development where there is the commercial use of a dwelling unit, by a resident of that dwelling unit, for a business. The

	business shall not require more than one (1) business associated visit per day to the dwelling unit. The business must be secondary to the residential use of the building and no aspects of the business operation shall be detectable from outside the property. The dwelling unit shall not be used as a work place for non-resident employees of the business and shall have no retail sales. There shall be no outdoor business activity or storage of materials or equipment allowed on site.
Major, Home Occupation	A development in a Country Residential district consisting of the use of a dwelling unit and/or an accessory building or structure by a resident of that dwelling unit, for a business. The business may generate more than one business-associated visit per day. The business use must be secondary to the residential use of the building and shall not change the residential character of the dwelling unit and/or accessory building. This may include limited storage of trucks and related vehicles and minor equipment storage including a limited amount of construction equipment and other similar uses. It may also include a limited amount of agricultural processing provided there are fewer than three (3) non-resident employees.
Oilfield Contractor, Supply, Maintenance, Service Storage, and Offices	(see OILFIELD SUPPORT SERVICES).
Oilfield Support Services	A development that provides cleaning, servicing, repairing or testing of materials, goods and equipment normally associated with the oil and gas industry and may include the storage or shipping of such materials, goods and equipment, including petrochemical products and supplies, provided such storage does not exceed 5,000m³ for all organic or inorganic chemicals and 10,000m³ for all petroleum products and that such storage is in accordance with all applicable provincial and federal statutes. This definition applies to oil and gas industry support operations and includes, but is not limited to, seismic and surveying, well servicing, oilfield haulers, pipeline contractors and welding operations.
Recycling Depot	A building or land in which used material is separated and processed prior to shipment for repeated use or to others who will use those materials to manufacture new products, and may include the handling of hazardous materials.
Residential Dwelling	A detached single-family dwelling unit, including attached structures such as porches and decks, or a single-family dwelling unit in a structure that contains more than one separate residential dwelling unit which is used or occupied or intended to be used or occupied, in whole or in part, as the home or residence of one or more persons.

10.0 MAPS

List of Maps

Map 1. - Location Map



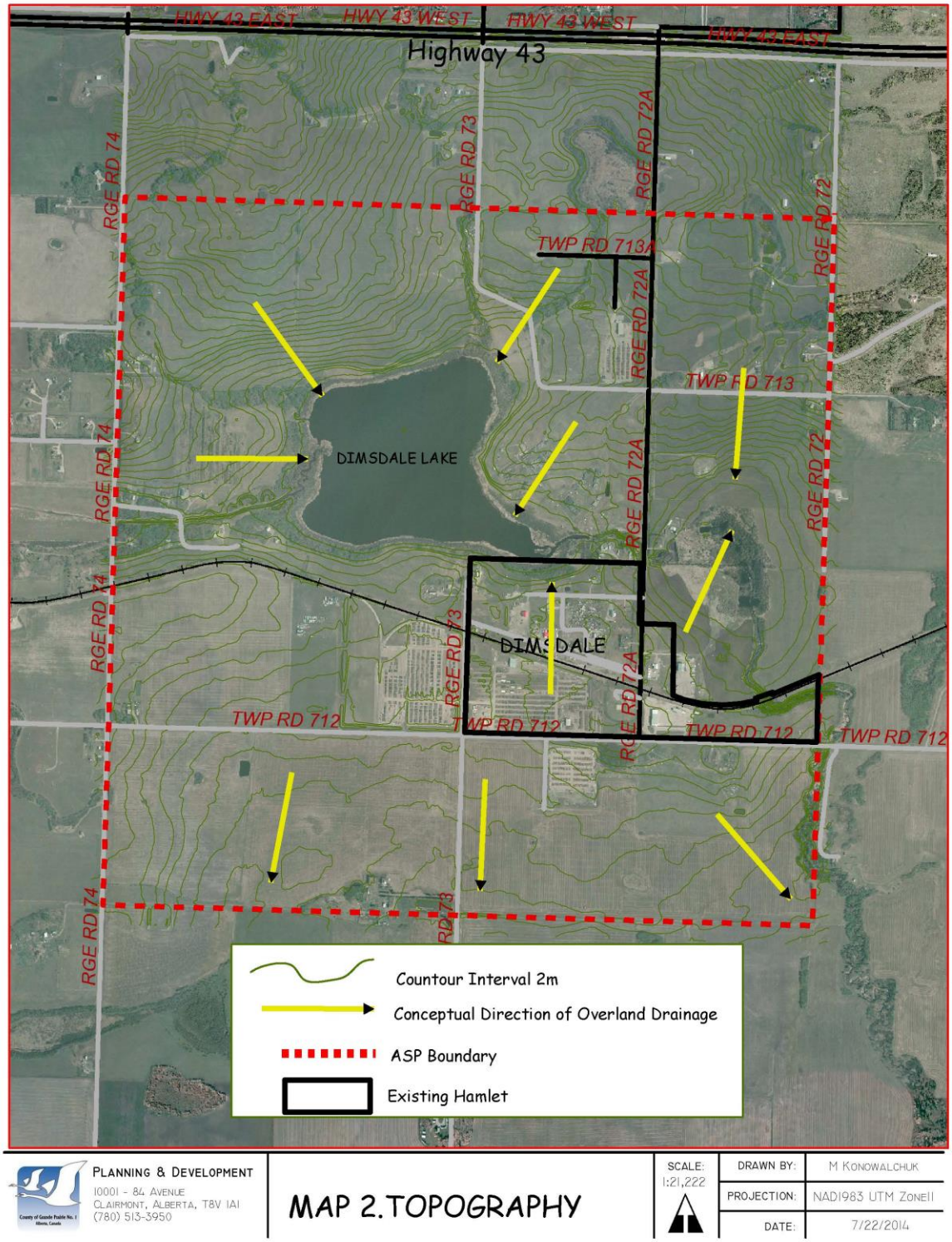
PLANNING & DEVELOPMENT
10001 - 84 AVENUE
CLAIRMONT, ALBERTA, T8V 1A1
(780) 513-3950

MAP 1 LOCATION

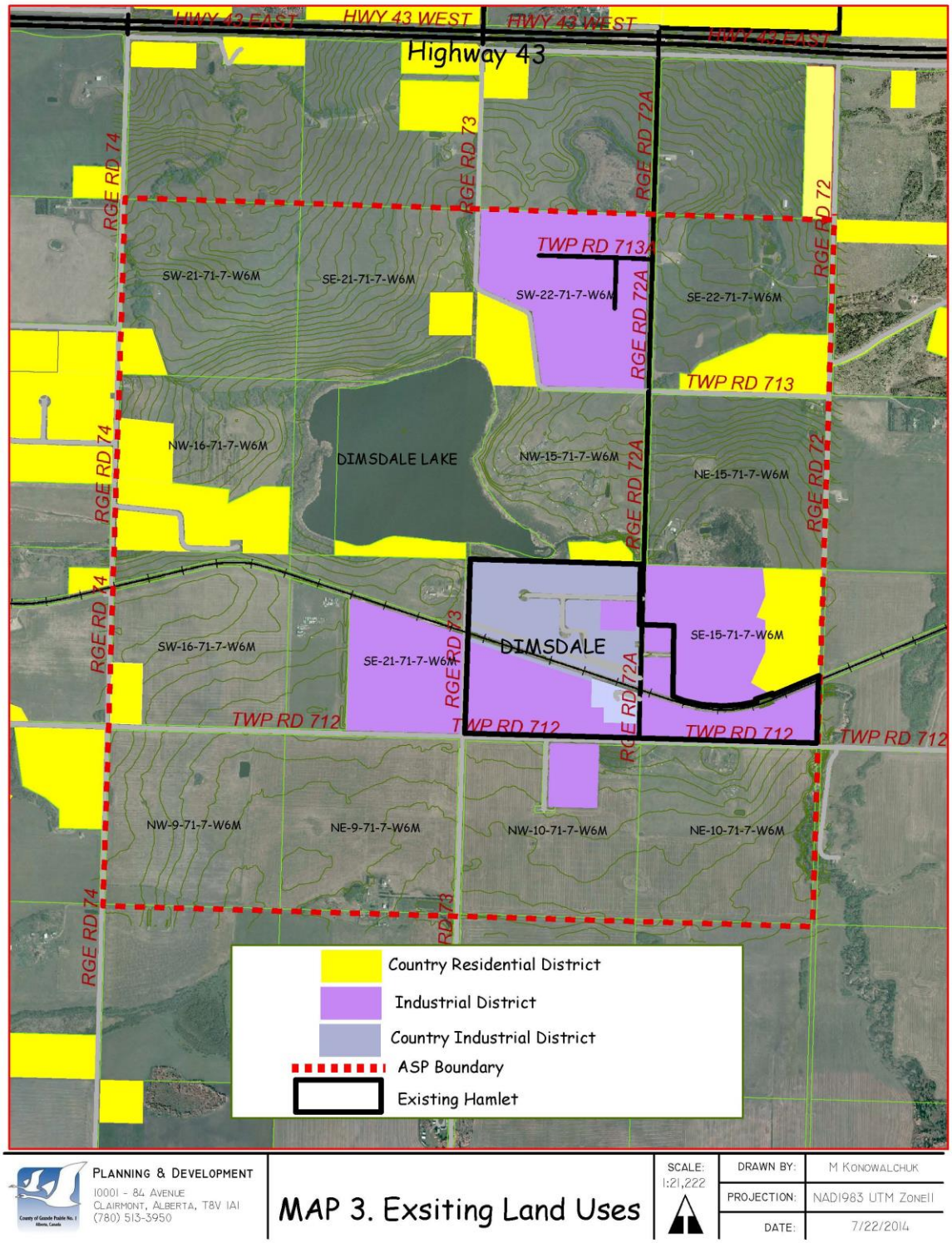
SCALE: 1:135,491

DRAWN BY:	M KONOWALCHUK
PROJECTION:	NAD1983 UTM ZONE11
DATE:	7/23/2014

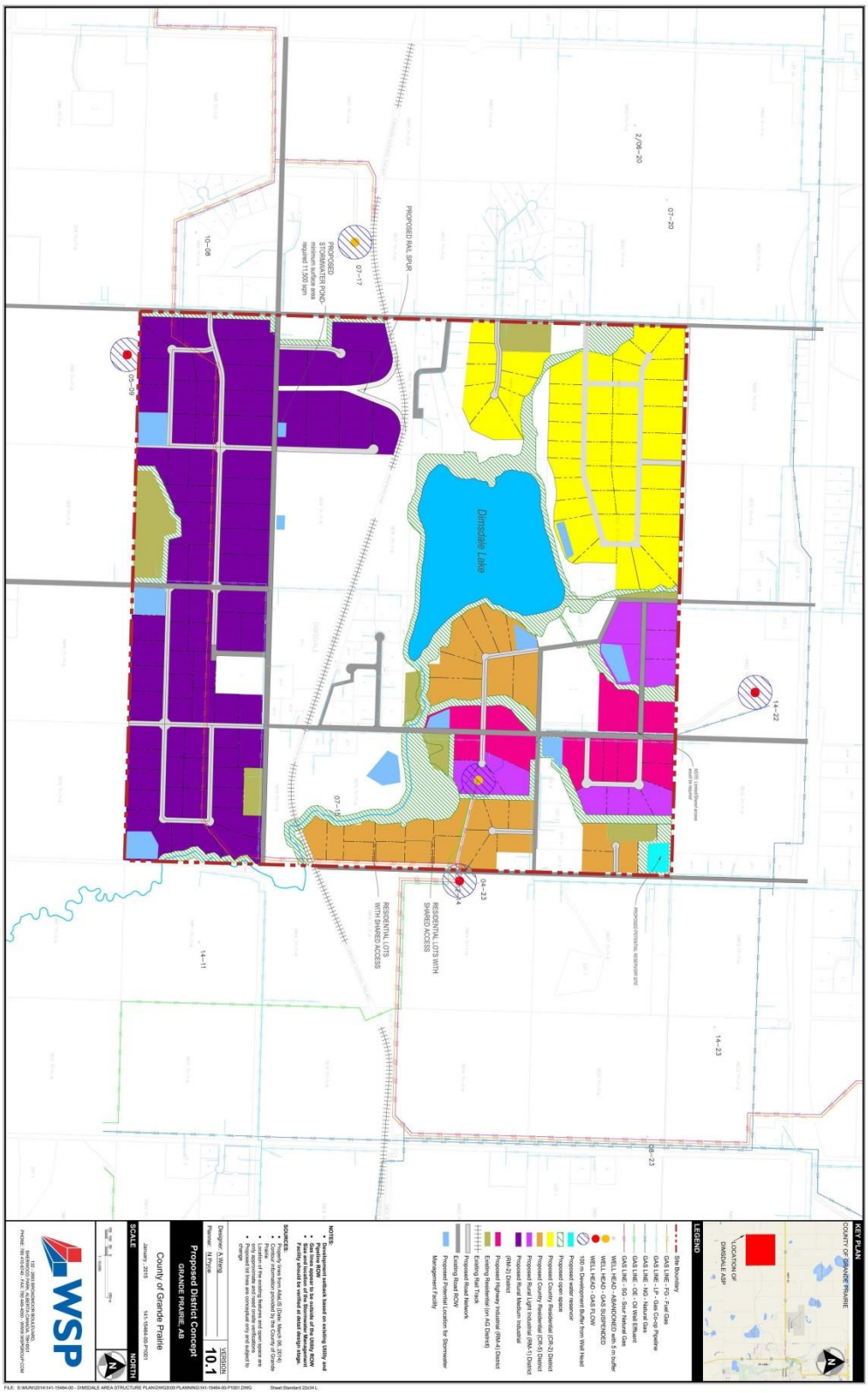
Map 2 – *Topography*



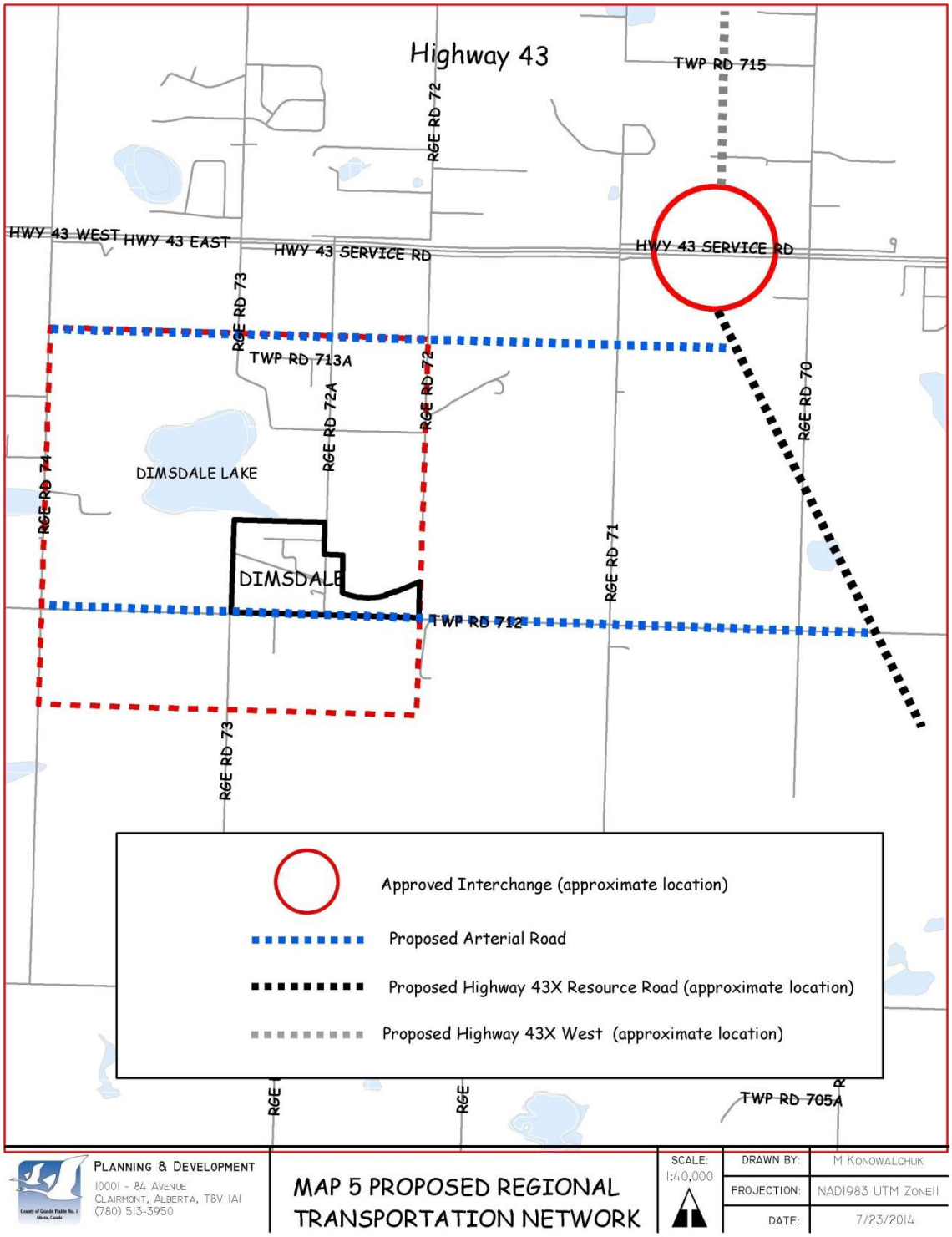
Map 3 - *Existing Land Uses*



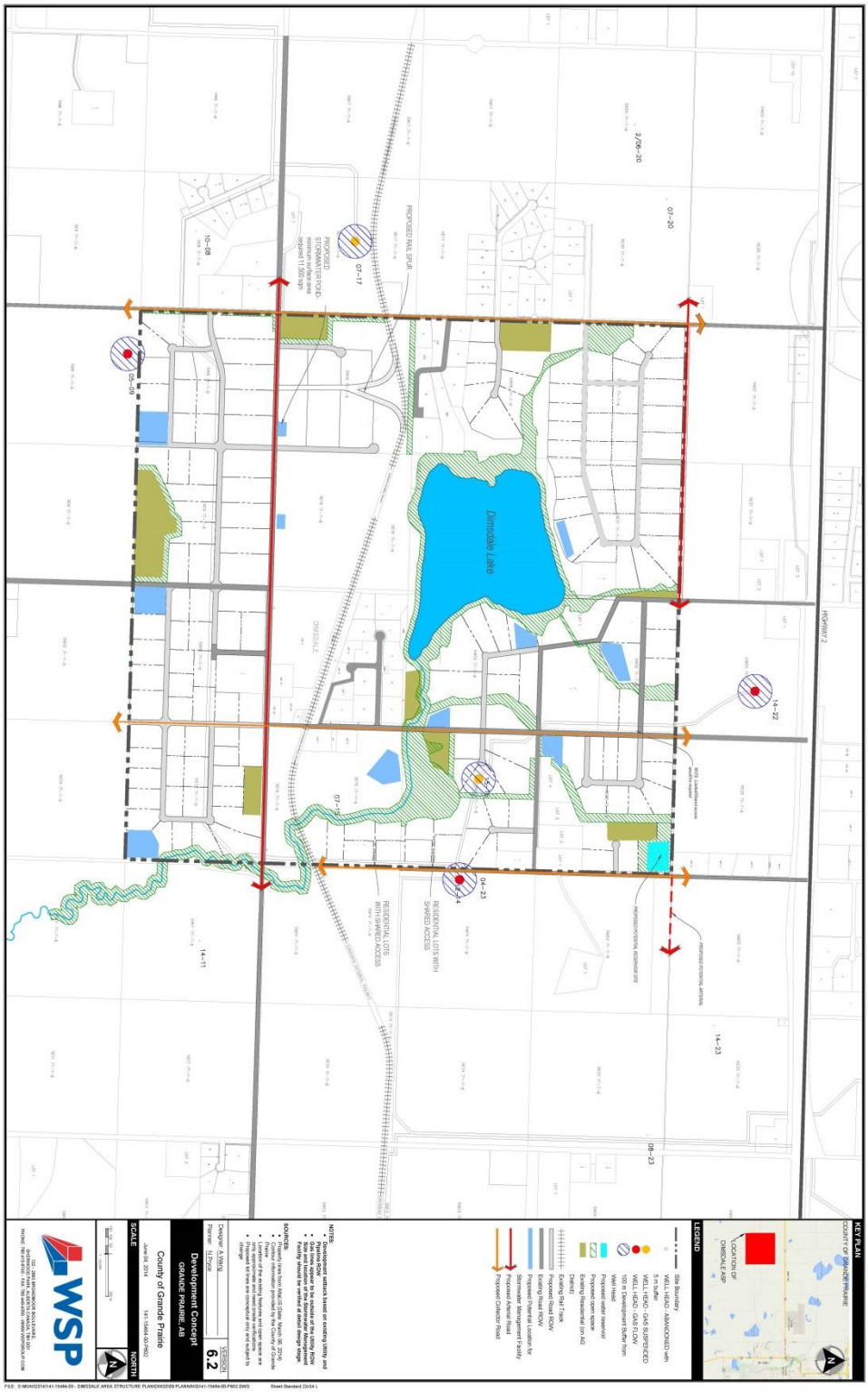
Map 4– *Development Concept*



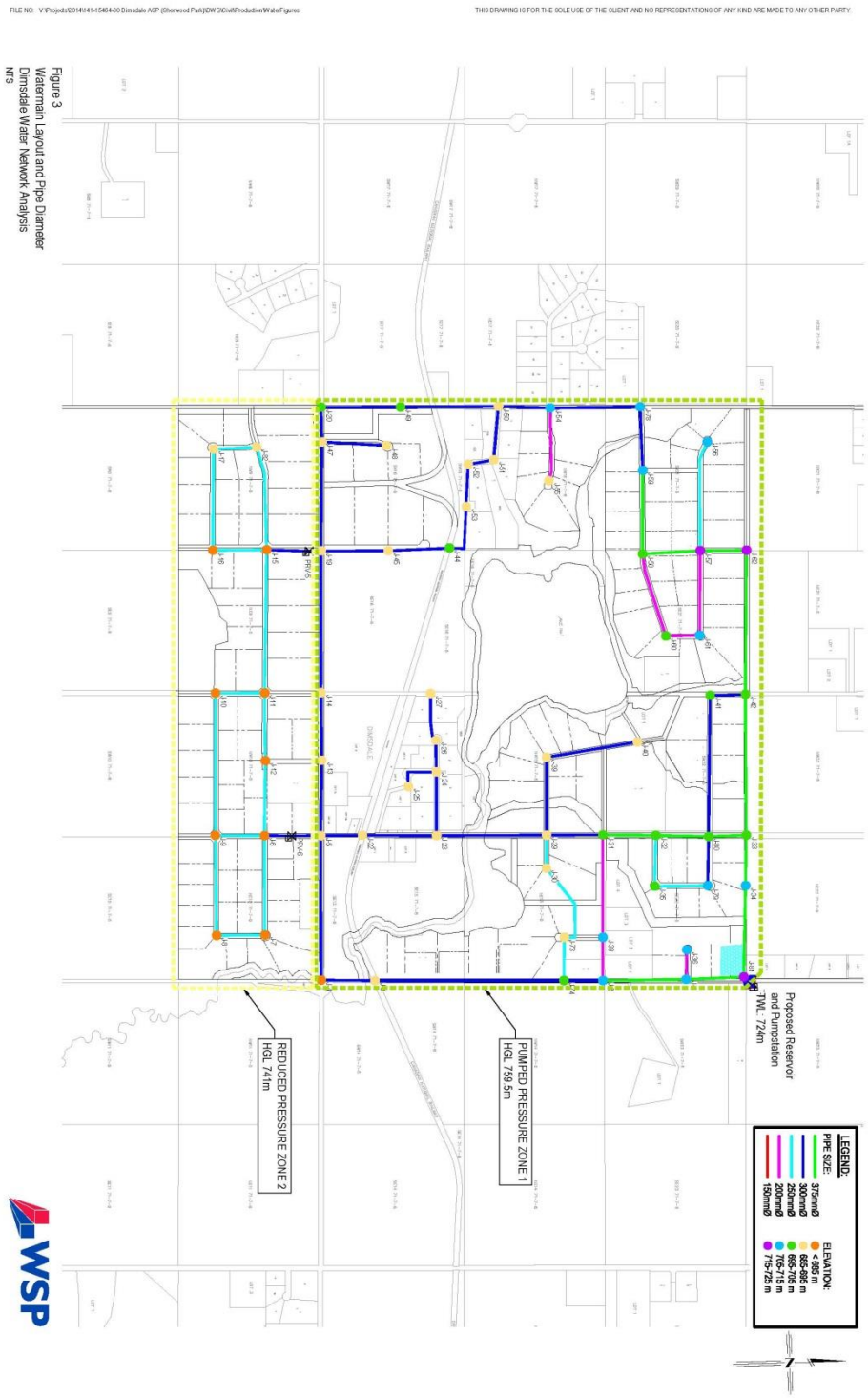
Map 5 - *Proposed Regional Transportation Network*



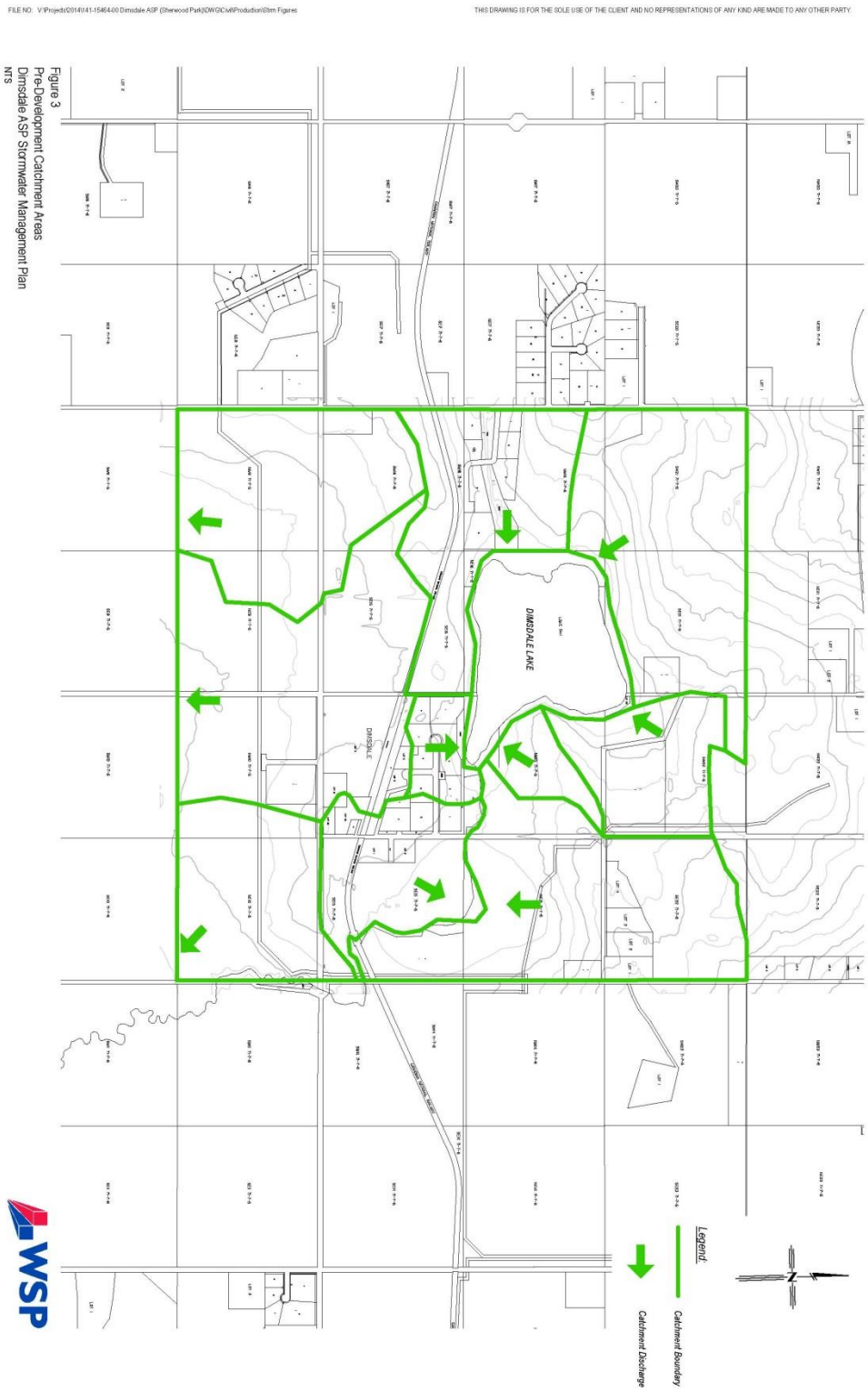
Map 6 - *Proposed Internal Transportation Network*



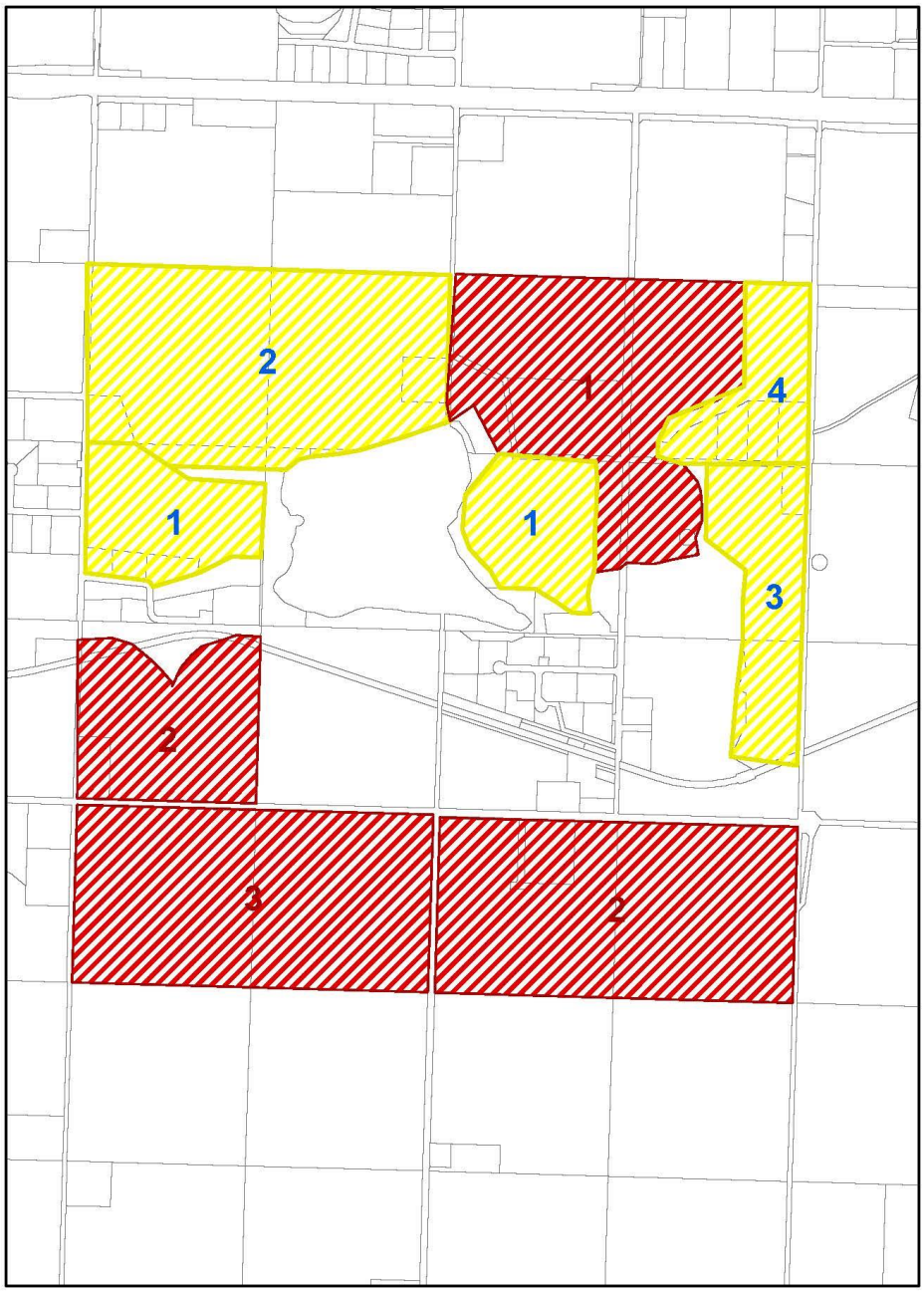
Map 7 – *Conceptual Water Servicing Plan*



Map 8 – *Conceptual Stormwater Servicing Plan*



Map 9 – Phasing



Legal Description	Ownership	Area in Acres
SW-22-71-7-W6M	Private	85.88
SW-21-71-7-W6M	Private	150.76
SW-22-71-7-W6M; Lot 1, Block 1, Plan 062 0050	Private	41.28
SW-21-71-7-W6M	Private	9.24
NW-16-71-7-W6M; Lot 4, Block 1, Plan 822 2607	Private	4.10
NW-16-71-7-W6M; Lot 6, Block 1, Plan 822 2607	Private	8.92
NW-16-71-7-W6M; Lot 4A, Block 1, Plan 942 3763	Private	3.00
NW-16-71-7-W6M; Lot 5, Block 1, Plan 822 2607	Private	5.91
SE-15-71-7-W6M; Lot 2, Plan 002 2135	Private	4.00
SW-15-71-7-W6M; 3399CL	Private	2.28
NW-16-71-7-W6M	Private	99.95
NW-16-71-7-W6M; Lot 3, Block 1, Plan 822 2607	Private	6.38
NE-16-71-7-W6M	Private	40.20
NW-16-71-7-W6M; Lot 2, Block 1, Plan 822 2607	Private	4.57
SW-22-71-7-W6M; Lot 1, Plan 772 1525	Private	20.51
SW-22-71-7-W6M; R2, Plan 772 1525	Public	1.00
SW-15-71-7-W6M; Lot 1A, Plan 982 1721	Private	6.50
NW-16-71-7-W6M; Lot 1, Block 1, Plan 822 2607	Private	3.66
SW-15-71-7-W6M; Lot 2A, Plan 982 1721	Private	7.08
SW-15-71-7-W6M; Lot 2, Plan 952 4803	Private	2.08
SW-15-71-7-W6M; Lot 3, Plan 952 4803	Private	3.00
SW-15-71-7-W6M; Lot 3A, Plan 982 1721	Private	2.52
SW-16-71-7-W6M	Private	14.84
SE-16-71-7-W6M	Private	39.60
SW-15-71-7-W6M; Lot 3, Plan 002 4753	Private	4.80
SW-15-71-7-W6M; Lot 4, Plan 002 4753	Private	3.69
SE-15-71-7-W6M	Private	72.73

SW-15-71-7-W6M; AREA 1, Plan 972 0961	Private	4.21
SW-15-71-7-W6M; Lot 1, Block 1, Plan 042 0115	Private	6.74
SW-15-71-7-W6M; Lot 8MR, Plan 002 4753	Public	0.43
SW-15-71-7-W6M; AREA 2, Plan 972 0961	Private	1.71
SW-15-71-7-W6M; Lot 2, Block 1, Plan 042 0115	Private	4.05
SE-22-71-7-W6M; Lot 1, Plan 952 3392	Private	9.30
SW-15-71-7-W6M; Lot 9MR, Plan 002 4753	Public	2.06
SE-15-71-7-W6M; Lot 1, Plan 962 1003	Private	5.23
NW-9-71-7-W6M	Private	159.02
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SW-15-71-7-W6M; AREA 4, Plan 972 4803	Private	1.22
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SE-22-71-7-W6M; Lot 3, Plan 012 3645	Private	7.86
NW-15-71-7-W6M	Private	126.49
SW-15-71-7-W6M; Lot 2, Plan 792 2381	Private	43.98
SW-15-71-7-W6M; Lot 1, Plan 002 4753	Private	5.03
SW-15-71-7-W6M; Lot 5, Plan 002 4753	Private	5.13
NW-15-71-7-W6M; Lot 1, Plan 832 0321	Private	6.75

SE-16-71-7-W6M	Private	113.12
SE-22-71-7-W6M; Lot 4, Plan 012 3645	Private	8.82
SW-15-71-7-W6M; Lot 2, Plan 002 4753	Private	4.81
SW-15-71-7-W6M; Lot 6, Plan 002 4753	Private	5.22
NW-10-71-7-W6M	Private	139.24
SW-15-71-7-W6M; Lot 7, Plan 002 4753	Private	5.14
NW-10-71-7-W6M; Lot 3, Block 1, Plan 042 5719	Private	15.93
SE-15-71-7-W6M; Lot 3, Block 1, Plan 022 3215	Private	35.83
SW-15-71-7-W6M; Lot 12ER, Plan 002 4753	Public	2.43
SW-16-71-7-W6M	Private	9.82
NE-15-71-7-W6M	Private	150.23
NE-15-71-7-W6M; Lot 1 Block, 1 Plan 1324491	Private	5.88
SW-15-71-7-W6M; Lot 1, Plan 762 0466	Private	0.88
NE-16-71-7-W6M	Private	10.00
SE-22-71-7-W6M	Private	123.42
SE-22-71-7-W6M; Lot 2, Plan 012 3645	Private	9.12
NW-16-71-7-W6M; Lot 8ER, Plan 822 2607	Public	11.91
Total Road right-of-way and natural water bodies		**546.5**
Total		**2460**

SUMMARY OF RECOMMENDATIONS - COMMUNITY STANDARDS BYLAW

Recommendation 1: That County Council adopt a Community Standards Bylaw to create a clear, concise set of expectations for residents and property owners in the County of Grande Prairie No. 1.

The new Community Standards bylaw will make compliance easier to obtain and provide administration with an additional tool with which to enforce the Municipal Government Act as it relates to nuisance and unsightly premises. The Bylaw and subsequent regulations should address the following issues:

Unsightly Properties

- Prohibits the accumulation of material that creates an unpleasant odor or animal parts
- Prohibits open storage of industrial fluids
- Prohibits the accumulation of certain items that are visible from outside the property
- Prohibits the storage of appliances unless closing devices have been removed, it is not visible from outside the property or is locked at all times
- Outlines how building materials can be stored and for how long
- Exempts agriculture practices and landfills

Regulating Composting

- Prohibitions on what can be placed in a compost pile or container, where the pile can be placed, and a requirement for it to be maintained as to prevent odors and attracting animals.

Regulating Noise

- Prohibition of noise from a motor vehicle that disturbs or annoys
- Prohibition of noise from a property that disturbs or annoys
- Outlines maximum continuous sound levels in residential districts
- Outlines maximum non-continuous sound levels in residential districts
- Outlines what activities are prohibited during night time hours
- Prohibits idling trucks for longer than 20 minutes in or with 150 meters of a Residential District
- Outlines maximum continuous sound levels in non-residential districts
  Outlines maximum non-continuous sound levels in non-residential districts
- Exempts agricultural practices
- Allows for a temporary permit allowing noise levels in violation of the bylaw
- Outlines the permit application/process
- Requires a Major Event in the County to obtain a permit
- Outlines the permit process/appeal process
- Sets out exemptions to this part
- Outlines the process to appoint testers to test the sound monitoring equipment and the process for ensuring proper testing practices

Nuisances Escaping Property

- Prohibits an outdoor light from shining into an adjacent dwelling house
- Allows the light if it is shielded or if it is specified in a Development Permit
- Prohibits the height of grass any longer than 25 cm
- Allows for some exemptions

Maintenance of Buildings, Structures and Fences

- Obligation to maintain structures and fences

Excavations

- Prohibits excavations from becoming or remaining a danger to public safety

Littering

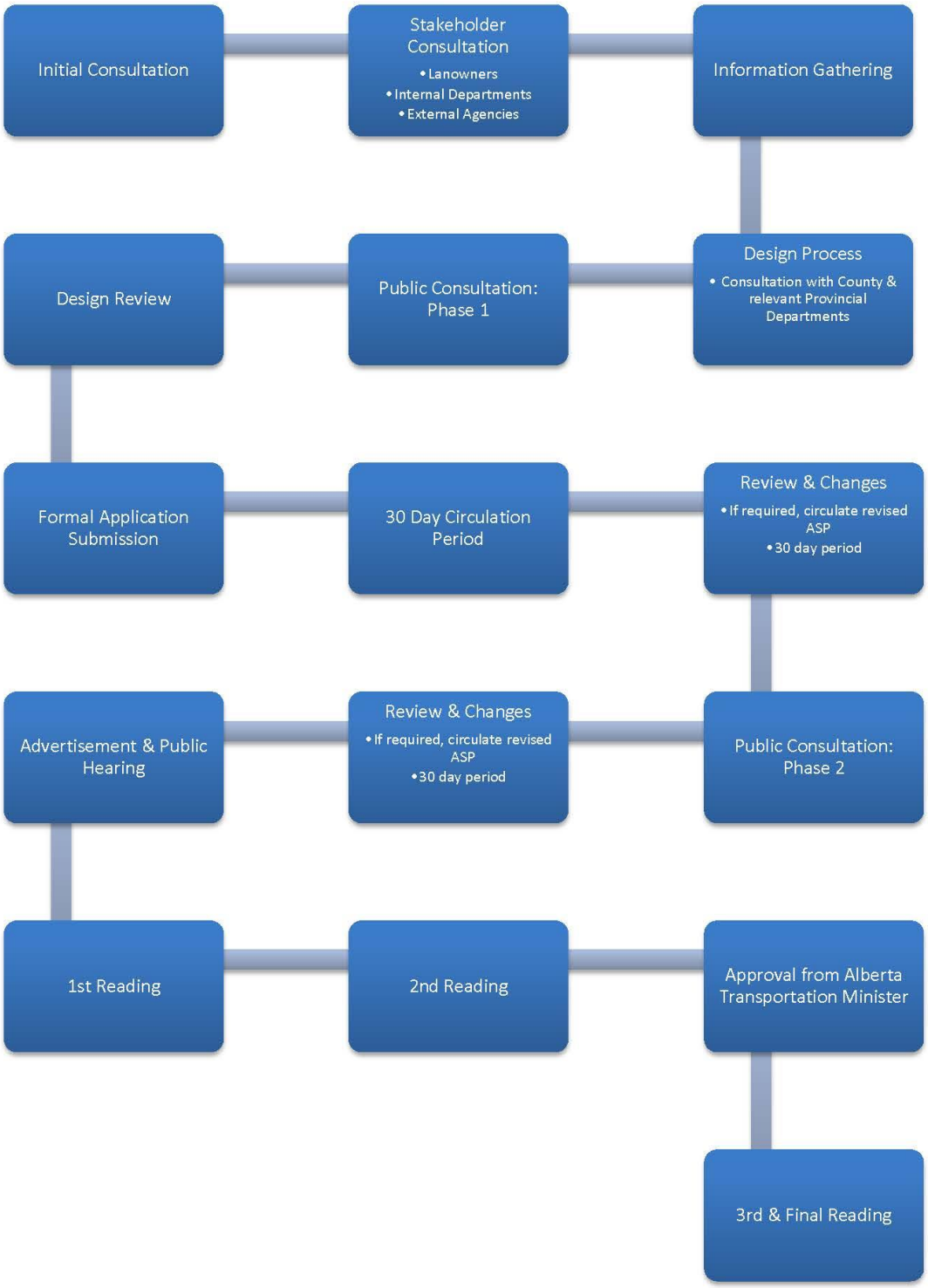
- Prohibits the disposal of refuse on public lands/highway
- Prohibits the transport of refuse unless properly secured from falling or blowing off
- Allows for the Registered owner of a vehicle to be charged
- Prohibits the disposal of refuse on private land without permission

Many offences should be enforced first through educating the property owner/representative of the infraction, and giving them an opportunity to rectify the problem. If the problem is not rectified within the time allotted, a clean-up or stop work order will be issued and/or a fine. Every situation will be judged on a case-by-case basis and proceed as the Development Officer, Safety Codes Officer, Fire Marshall or Public Works Road Authority sees fit.

COUNTY LAND USE BYLAW NO. 2680

Recommendation 2: That Council amend Section 17 of the County Land Use Bylaw No. 2680 to include: Safety Codes Officers, Enforcement Officers, Fire Marshalls and Public Works Road Authority as enforcement bodies.

Appendix C – Comprehensive Area Structure Plan Process Flowchart



WATER NETWORK ANALYSIS, DIMSDALE, AB, REVISION 1

WSP – SHERWOOD PARK

project no.: 141-15464-00

Prepared for:
WSP Sherwood Park Office

Date: October 7, 2014

Prepared by:

Jeff Somerville, P.Eng.
Project Engineer

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October 7, 2014

WSP Sherwood Park Office
132 – 2693 Broadmoor Blvd
Sherwood Park, Alberta T8H 0G1
Email: nick.pryce@wspgroup.com

Attention: Nick Pryce

Subject: **Dimsdale Alberta**
Water Network Analysis, Revision 1

Dear Nick,

We are pleased to submit our Water Network Analysis, revised per comments received from Aquatera Utilities.

If you have any questions or concerns please contact me to discuss.

Yours truly,

WSP

Jeff Somerville, P.Eng.
Project Engineer, Municipal Infrastructure

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APPENDICES

1 BACKGROUND

1.1 INTRODUCTION

The Dimsdale area is located in the County of Grande Prairie, about 15 km west of the City of Grande Prairie, refer to Figure 1. An Area Structure Plan (ASP) is being developed to outline the proposed servicing for the development. The site surrounds Dimsdale Lake, south of Highway 43, and incorporates some existing industrial and country residential areas. The proposed development of the land will be primarily industrial, with a portion designated large-lot country residential. Existing development is serviced by water wells and fire ponds. The proposed development will include an underground piped water system with a reservoir designed to accommodate domestic and fire protection demands for both existing and proposed lots. Water is to be supplied by Aquatera, the County's water provider via a new dedicated supply line. Costs associated with the new supply main will be the responsibility of the developer.

1.2 OBJECTIVES

WSP has been retained to plan the water distribution system for the Dimsdale area to support the Area Structure Plan (ASP). The primary objectives of this report are as follow:

- Provide a conceptual watermain network layout
- Determine the required reservoir size and top water level to supply the service area
- Determine if any pumping and/or pressure reducing facilities are required
- Prepare a water model to analyze the pipe network, provide preliminary pipe sizes, and review fire flow capacity

1.3 WATER SUPPLY

Aquatera supplies domestic water to the City of Grande Prairie and other areas within the County. Their existing water system extends to the intersection of Township Road 712 and Range Road 71, approximately 5 km from the proposed Dimsdale reservoir. The watermain network west of the City of Grande Prairie services rural developments and consists of small diameter pipes (100 & 150mm diameter). Initial information indicates the existing water system has capacity to supply the Dimsdale area with 500,000 L/day via a dedicated supply main that would need to be extended to the reservoir. The supply main and existing water network were not included in the water model created for this report; any upgrades to Aquatera's system required to support the Dimsdale development need to be assessed by others with copies of the reports and digital data provided to Aquatera. It has been assumed that a new dedicated water supply main will be constructed to support the Dimsdale development.

Aquatera has provided three alternate water supply options which may be investigated in future design reports based on the timing of the Dimsdale Development and various other water supply projects. The options are as follows:

- Connect to a future transmission line that will extend west to Wembley. A new booster pump station located south of the Dimsdale ASP would be constructed to supply the proposed Dimsdale reservoir.

- Connect to the Airport reservoir once the dedicated fill line is complete, which is anticipated to be in service in the next 2-3 years.
- Provide a trickle feed to the Dimsdale development. This option is not recommended as it provides a low level of service and no fire protection.

2 SYSTEM DESIGN

The water system for Dimsdale as shown in Figure 2 has been created based on the proposed lot layout and existing contours. A single elevated reservoir and pump station is included at the northeast corner of the site to provide domestic and fire flows. Pipe sizes and system pressures are in general accordance with the County of Grande Prairie Minimum Design Standards. Further details of the proposed water system are below.

2.1 DOMESTIC DEMAND

Domestic demands have been calculated based on County of Grande Prairie Minimum Design Standards in conjunction with the proposed land use plan and existing zoning data.

CRITERIA	COUNTY STANDARD	AREA	VALUE
Residential ADD[1]	275 L/c/d 3.2 people/home[2]	326 ha 1 home/ha[2]	287,000 L/d
Industrial ADD	10,000 L/ha/d	574 ha	5,737,000 L/d
		Total ADD	**6,024,000 L/d** **69.7 L/s**
MDD[3] peaking factor	Residential: 2 x ADD Industrial: 1.5 x ADD	***Total MDD***	**9,180,000 L/d** **106.2 L/s**
PHD[4] peaking factor	Residential: 3 x ADD Industrial: 2 x ADD	***Total PHD***	**12,335,000 L/d** **142.8 L/s**

CRITERIA	COUNTY STANDARD
Minimum system pressure during PHD[4]	280 kPa (40 psi)
Maximum static pressure	690 kPa (100 psi)
Minimum pipe sizes	Single family: 150mm Multifamily: 200mm Industrial: 250mm
Hazen-Williams C-factor for PVC	140

[1] ADD refers to average daily demand

[2] The County standard is 10 homes per hectare, however, for country residential the minimum lot size is 1 ha, so the value has been reduced to 1 home/ha.

[3] MDD refers to maximum daily demand

[4] Generally, a minimum static pressure of 350 kPa (50 psi) at the lot service is provided, per the Alberta Standards and Guidelines.

Based on the calculated average daily demand for Dimsdale, the required flow exceeds what is available from Aquatera by approximately 5M litres per day. Coordination with Aquatera is required to determine what off-site improvements are required to supply the proposed development at Dimsdale. In addition, it is estimated a dedicated 450mm supply main will be required to service Dimsdale once the area is fully developed. During the average day demand of 6M litres per day, the mean velocity in the supply main is calculated at 0.44 m/s. The final sizing of the supply main will be part of a future study, including consideration of servicing lands beyond Dimsdale.

2.2 FIRE FLOW

A comprehensive fire flow analysis of the proposed water distribution network has been undertaken based on the following requirements taken from the County of Grande Prairie No. 1 Minimum Design Standards, section 25.3.6:

CRITERIA	COUNTY STANDARD
Single family minimum fire flow	95 L/s
Industrial minimum fire flow	225 L/s
Minimum system pressure during MDD and fire flow	140 kPa (20 psi)

Each node in the water model was assigned a minimum fire flow requirement based on the existing and proposed land use immediately adjacent to the node. In areas where a node is bordered by both single family lots and industrial lots, the higher of the required fire flow requirement was assigned.

2.3 RESERVOIR

The Alberta Standards and Guidelines for Municipal Waterworks, Part 2, recommends sizing reservoirs is as follows:

- **Fire Storage**: volume of water required for firefighting purposes.
- **Equalization Storage**: 25% of MDD to balance fluctuations in demands and allow for reasonable on/off frequencies of the supply pumps.
- **Emergency Storage**: 15% of average daily flow to account for events such as natural disasters, pump power failure, source failure, or watermain breaks.

CRITERIA	VALUE
Maximum Daily Demand (MDD)	106.2 L/s 9,180,000 L/day
Fire Flow	225 L/s
Fire Flow Duration[1]	3 hours
Fire Flow Storage	2,430,000 L
Balancing (25% of MDD)	2,295,000 L
Emergency (15% of ADD)	861,000 L
Total Reservoir Storage Required	**5,585,000 L**

[1] Fire flow duration taken from the Fire Underwriters Survey (FUS) guidelines.

The Dimsdale property generally falls from north to south and the proposed reservoir is located at the northeast corner of the site, shown in Figure 2. This location provides the highest elevation for the reservoir while minimizing the length of the required supply watermain. As required by Aquatera, an at-grade reservoir is proposed, which may have multiple cells to allow for regular maintenance. Additionally, construction of the reservoir could be phased based on the proposed development schedule. To provide adequate static water pressure to the lots along the northern site boundary, a booster pump station is required. Preliminary pump curves have been included in the water model.

2.4 PRESSURE ZONES

The Dimsdale site has existing elevations that vary between approximately 677m and 724m, which results in a static water pressure variance of 455 kPa (66 psi). Providing a static water pressure of 345 kPa (50 psi) to the high elevation areas, results in the maximum pressure in the low-lying lands is 800 kPa (116 psi) if a single pressure zone is maintained. For that reason, a reduced pressure zone is proposed at the southern limit of the ASP. The reduced pressure zone is serviced by two PRV stations for redundancy. A summary of the pressure zone is below:

PARAMETER	ZONE 1	ZONE 2
Reservoir Top Water Level (TWL)	724.0m	
Hydraulic Grade Line (HGL)	759.5m	741.0m
Highest Ground Elevation	724.0m	694.0m
Static Pressure	345 kPa (50 psi)	455 kPa (66 psi)
Lowest Ground Elevation	688.5m *	677.0m
Static Pressure	700 kPa (100 psi) *	620 kPa (90 psi)

* Note, there are two isolated areas (nodes J-4 and J-50) in the Zone 1 where pressures exceed 700 kPa to a maximum value of 750 kPa (109 psi). In these areas, lots will require individual PRVs if water services are required.

Proposed system pressures are generally within 350-700 kPa (50-100 psi) in both the static and maximum daily demand conditions, as required by the County standards.

3 RESULTS

The proposed Dimsdale development has been modelled using Bentley WaterGEMS software under average day, maximum day, peak hour, and fire flow conditions to analyse system pressures and velocity in the pipes. Water quality parameters, such as chlorine residual have not been modelled and should be included in future design reports. The information below is to be viewed along with Figures 3 through 6 found in Appendix A, which provide a graphical representation of the modelling results. Figure 6 includes the minimum required fire flow at each node.

	ADD	MDD	PHD
System Demand	69.7 L/s	106.2L/s	142.8 L/s
Minimum System Pressure	J-62: 325 kPa J-81: 391 kPa J-57: 419 kPa	J-62: 320 kPa J-81: 328 kPa J-57: 386 kPa	J-62: 309 kPa J-81: 323 kPa J-57: 375 kPa
Maximum System Velocity	J-2 to J-74: 0.41 m/s	J-2 to J-74: 0.62 m/s	J-2 to J-74: 0.83 m/s

With the exception of nodes J-62 and J-81, the entire Dumasfield system is above the minimum desirable system pressure of 350 kPa (50 psi) during both ADD and MDD. Both nodes J-62 and J-81 are at the outer limits of the development and are at isolated high points, resulting in the slightly low water pressure, which will affect only a few single family homes. As noted in Section 3.1 below, the required fire flow is met at this node.

During peak hour demand, all nodes within the system exceed the minimum required pressure of 280 kPa (40 psi).

While the County does not have a maximum velocity specification, typically under peak hour demand velocity should be below 1.5 m/s to limit scouring; all pipes proposed meet this target.

3.1 FIRE FLOW

A full fire flow analysis was undertaken at each node to determine if the required fire flow as noted in Section 2.2 can be met with the proposed water system design. The fire flow analysis is undertaken during maximum day demand for an added factor of safety. Each node within the Dimsdale network meets the fire flow requirement, with 85% of the nodes providing in excess of 225 L/s. The nodes with the lowest fire flow available are located at the northwest corner of the property at high elevations, which area is slated for development of single family units with reduced fire flow requirements of 95 L/s. Refer to the table below for specific fire flow data:

NODE	REQUIRED FIRE FLOW (L/S)	AVAILABLE FIRE FLOW (L/S)
J-55	95	145.8
J-56	95	152.8
J-61	95	187.7
J-60	95	198.1
J-62	95	205.8
J-78	95	207.3
J-57	95	210.8
J-36	95	212.9
J-58	95	219.3
J-59	95	221.3
All Other Nodes	95-225	225+

Fire flows will vary as the water system is developed during phased construction. The water model should be revisited to review available fire flows for each construction phase. Where possible, watermain loops should be constructed with each phase to provide redundancy and improved fire flow.

3.2 CLOSING

The proposed water network for the Dimsdale development provides an acceptable level of service for both domestic pressures and fire flows. An at-grade reservoir, booster pump station, and a new dedicated supply main by Aquatera (at the developer's expense) will be required to support the proposed and existing development. Consideration should be given to re-chlorination facilities to provide a residual disinfectant in the water distribution system due to the remote location of the site.

This report entitled Water Network Analysis, Revision 1, Dimsdale Alberta, dated October 7, 2014 is respectfully submitted by,

WSP

Jeff Somerville, P.Eng.
Design Engineer

Ron Akehurst, P.Eng.
Review Engineer

DISCLAIMER

This document was prepared by WSP for the private and confidential information of the client for whom it was prepared and for the particular purpose previously advised in writing by the client to WSP.

This document was prepared based on information available to WSP at the time of preparation, and is subject to all limitations, assumptions and qualifications contained herein. In addition, financial or other projections contained herein are based upon assumptions concerning future events and circumstances over which WSP has no control. Such projections are by their nature uncertain, and should be treated accordingly and read in the full context of this document's contents. WSP makes no warranties in regards to the contents of this document, including such projections.

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Appendix A

FIGURES

Figure 1
Location Plan
Dimsdale Water Network Analysis

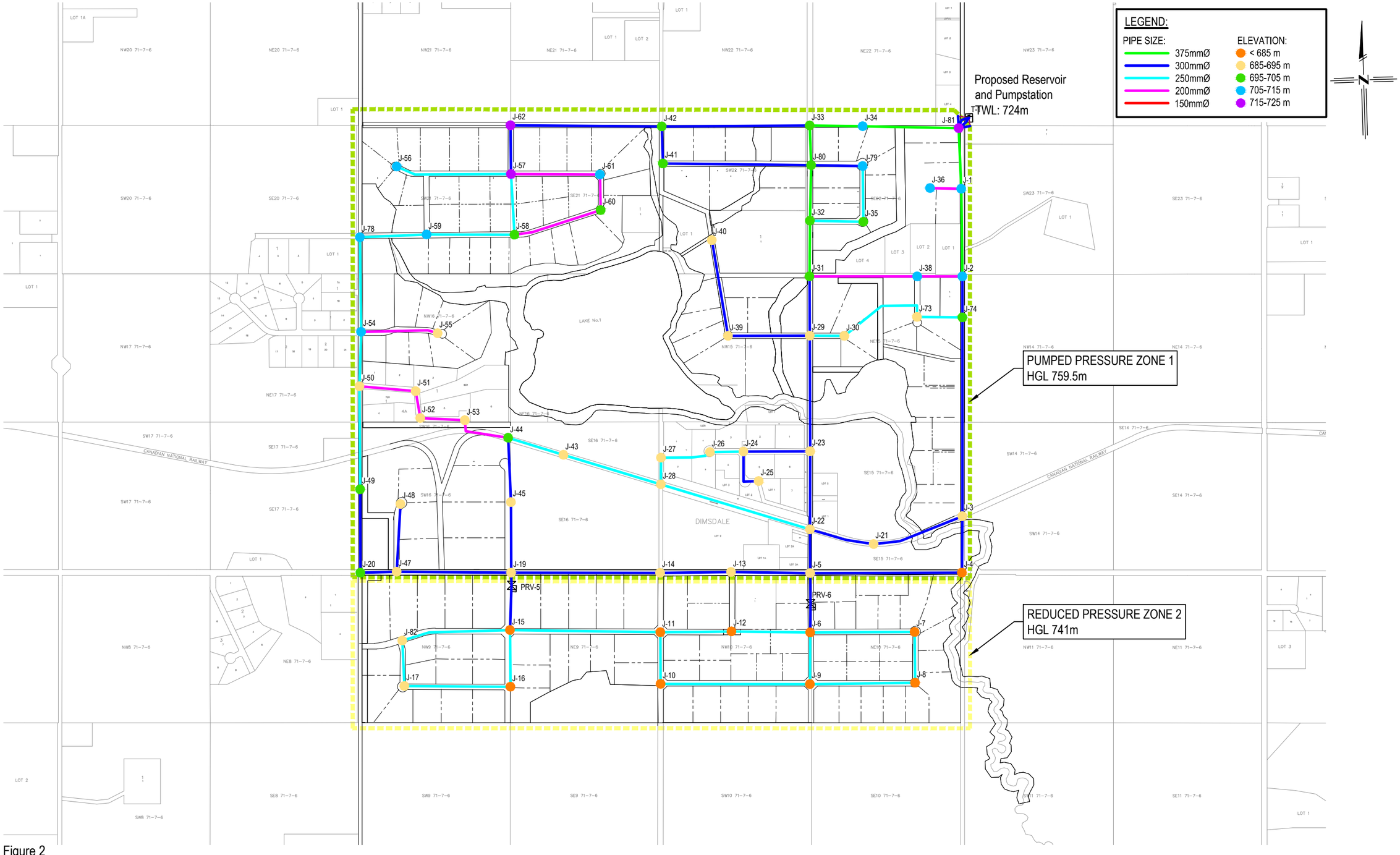

Figure 2
Watermain Layout and Pipe Diameter
Dimsdale Water Network Analysis
NTS

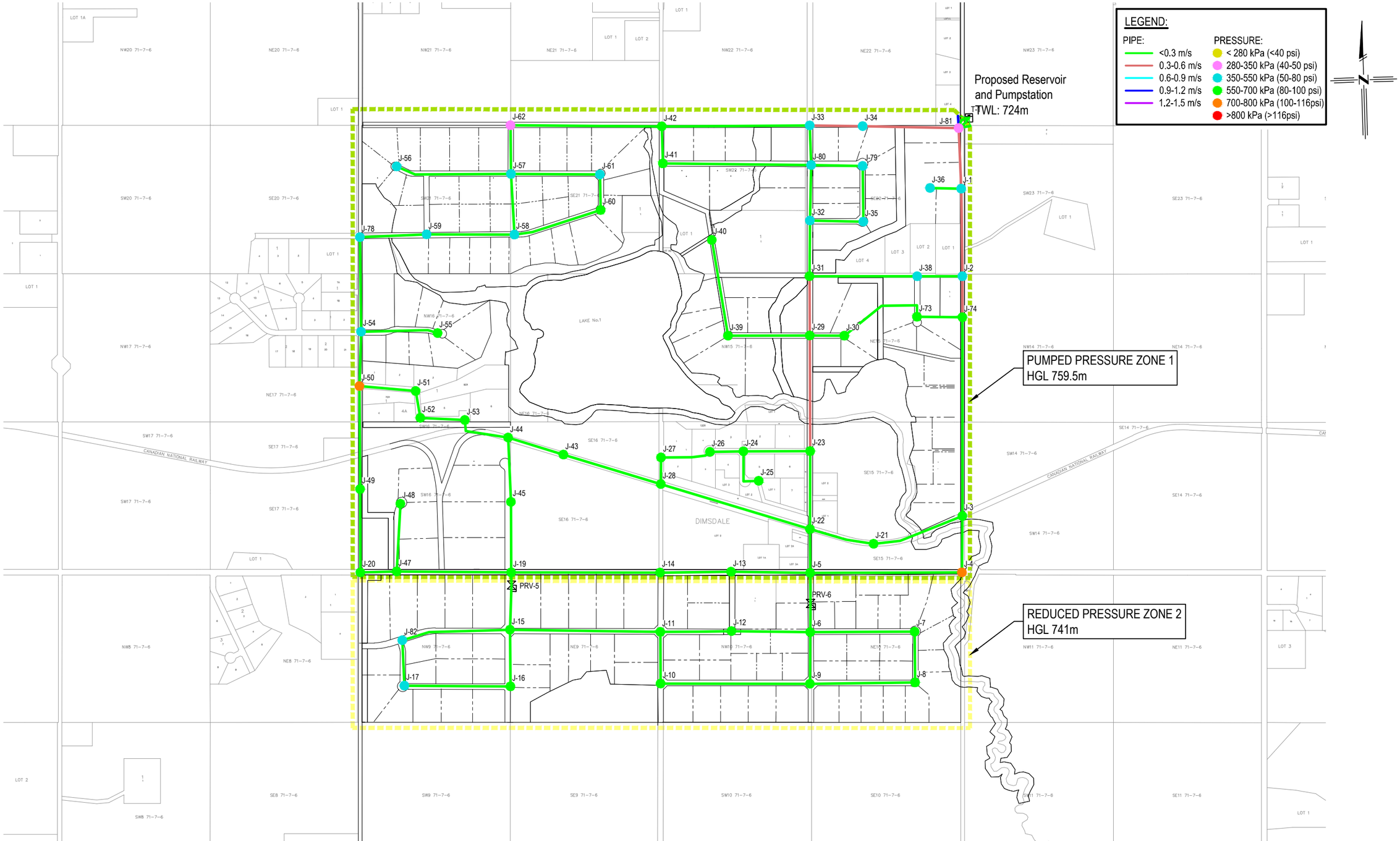

Figure 3
Pressure and Velocity During Average Day Demand
Dimsdale Water Network Analysis
NTS

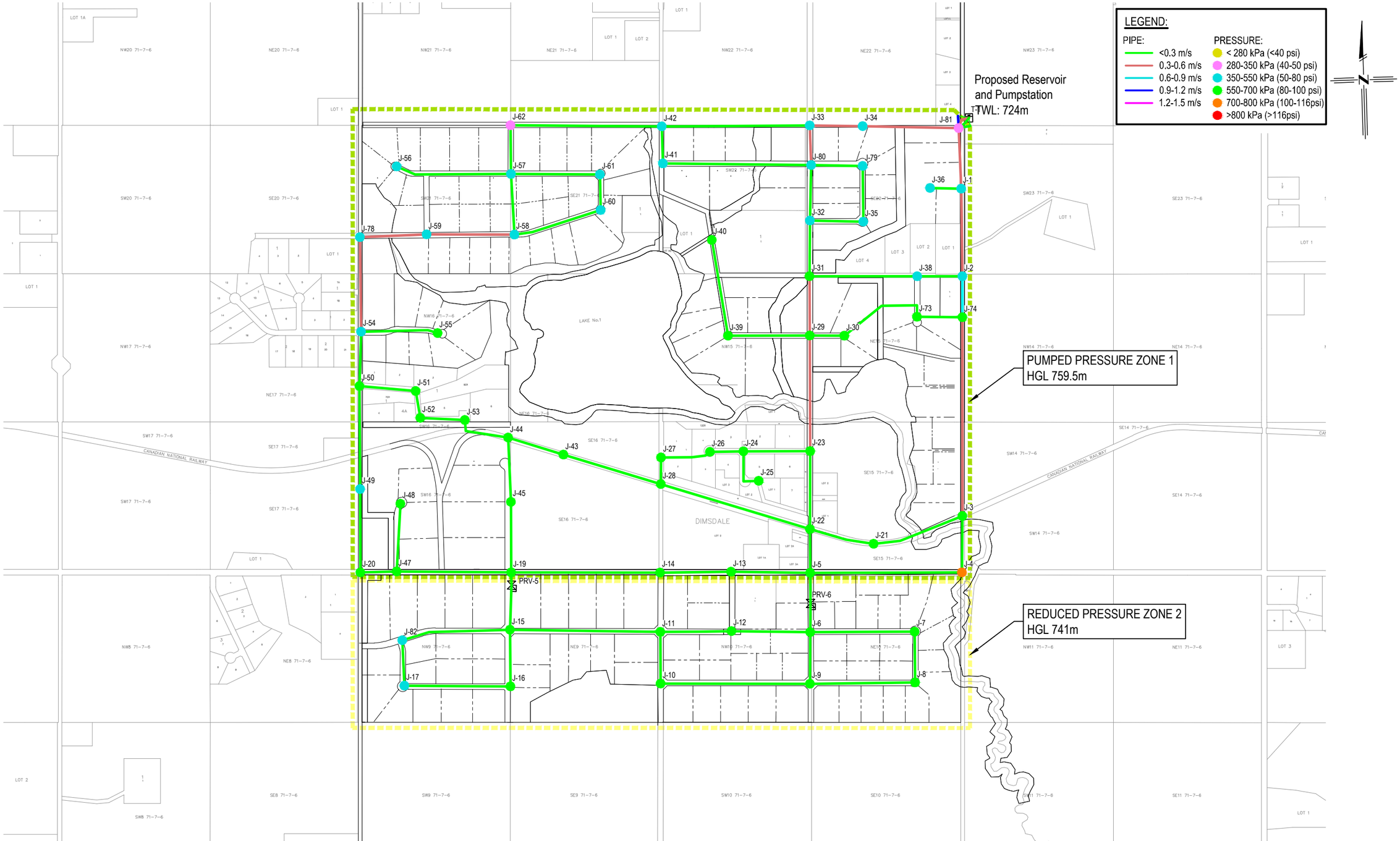

Figure 4
Pressure and Velocity During Maximum Day Demand
Dimsdale Water Network Analysis
NTS

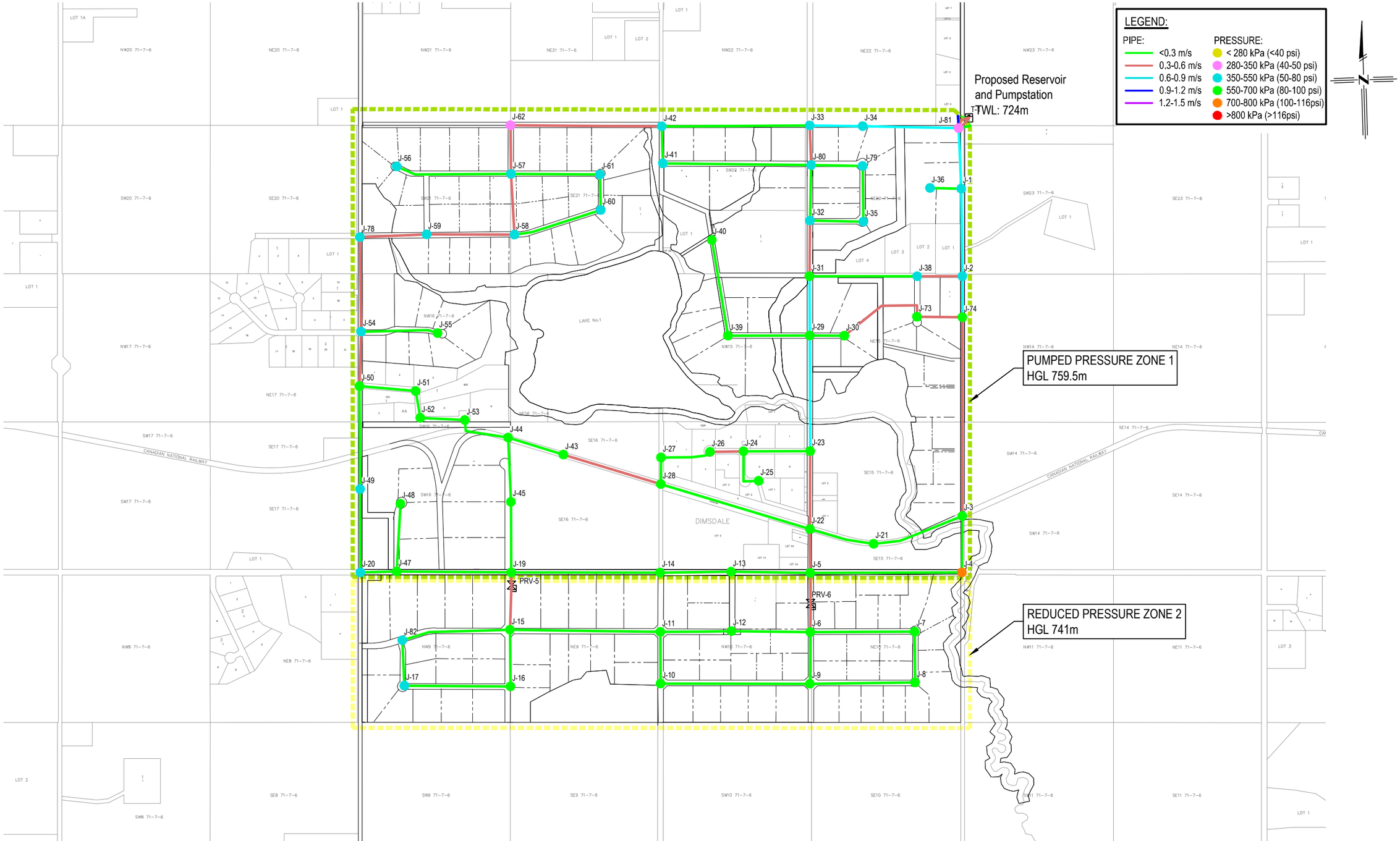

Figure 5
Pressure and Velocity During Peak Hour Demand
Dimsdale Water Network Analysis
NTS

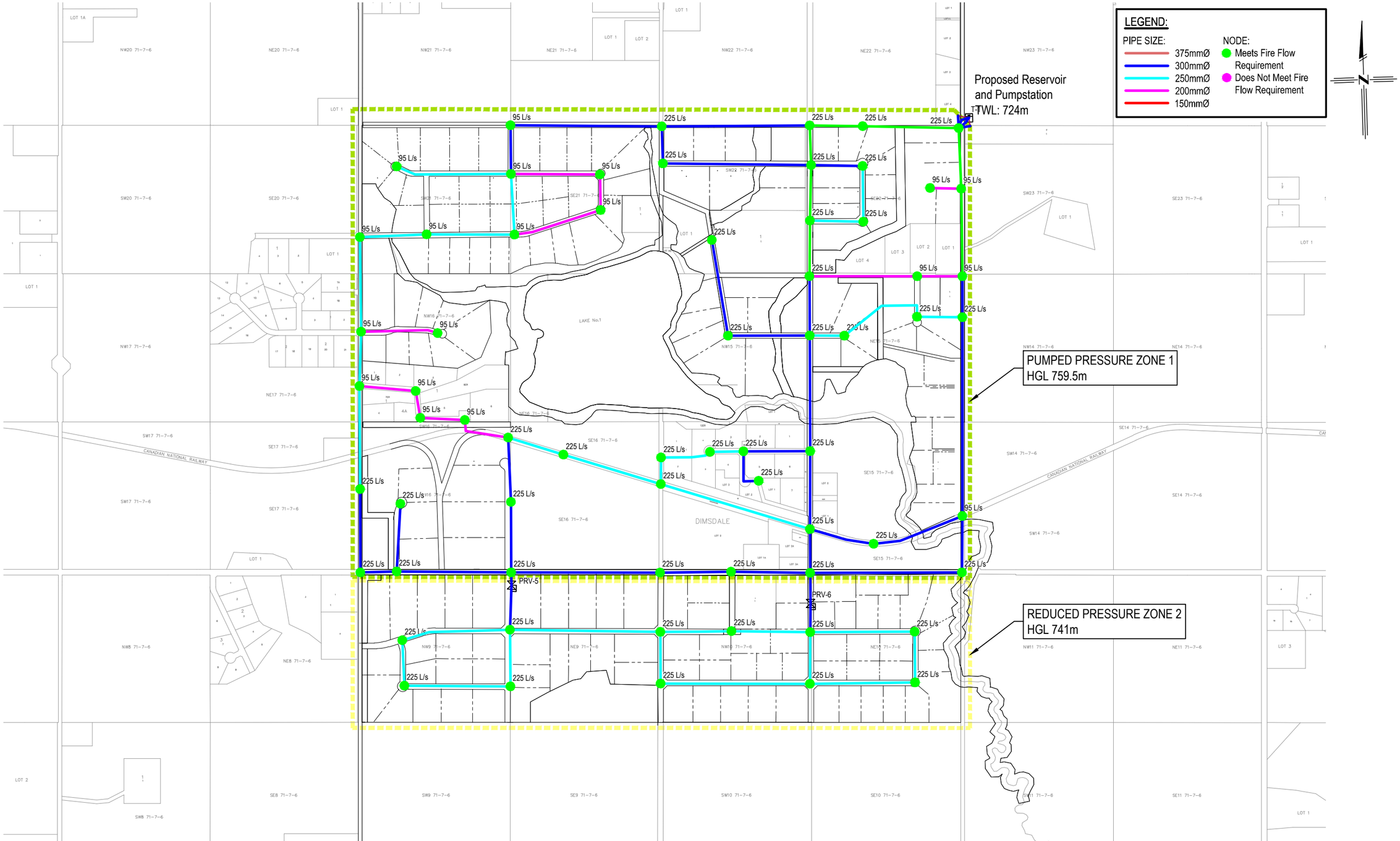

Figure 6
Fire Flow Analysis
Dimsdale Water Network Analysis
NTS

STORMWATER MANAGEMENT REPORT, DIMSDALE, AB, REVISION 1

WSP – SHERWOOD PARK

project no.: 141-15464-00

Prepared for:
WSP Sherwood Park Office

Date: February 24, 2015

Prepared by:

Jeff Somerville, P.Eng.
Project Engineer

WSP Canada Inc.
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February 24, 2015

WSP Sherwood Park Office
132 – 2693 Broadmoor Blvd
Sherwood Park, Alberta T8H 0G1
Email: nick.pryce@wspgroup.com

Attention: Nick Pryce

Subject: **Dimsdale Alberta**
Stormwater Management Report

Dear Nick,

We are pleased to submit our Stormwater Management Report, revised with the updated land use plan.

If you have any questions or concerns please contact me to discuss.

Yours truly,

Jeff Somerville, P.Eng.
Project Engineer, Municipal Infrastructure

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APPENDICES

1 BACKGROUND

1.1 INTRODUCTION

The Dimsdale area is located in the County of Grande Prairie, about 15 km west of the City of Grande Prairie. An Area Structure Plan (ASP) is being developed to outline the proposed servicing for the development. The site surrounds Dimsdale Lake, south of Highway 43, and incorporates some existing industrial and country residential areas. The proposed development of the land will be primarily industrial, with a portion designated large-lot country residential.

This stormwater management plan is undertaken for the purpose of identifying courses of action to develop and implement Best Management Practices for the guardianship of stormwater through, and from the site. It is intended to form a basis for detailed design work of the various phases of the project. Final results of this plan show that the recommended methods of treatment will achieve the mandates set out in the County of Grande Prairie minimum design standards and Alberta Government standards. Both stormwater quality and quantity control strategies are discussed based on a stormwater modelHeading 3

1.2 REFERENCE DOCUMENTS

The following documents were utilized in creating the stormwater management plan:

- County of Grande Prairie No. 1 Minimum Design Standards, 2003
- Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems, Part 5: Stormwater Management Guidelines, March 2013
- Stormwater Management Guidelines for the Province of Alberta, Environmental Sciences Division, January 1999List Bullet Tier 1

1.3 PLANNING GOALS

In accordance with the above noted documents, this storm water management plan includes the following aspects:

- A minor drainage system, including catchbasins and pipes, sized for the 1:5 year rainfall event.
- A major drainage system to convey overland flow in an acceptable manner for up to the 1:100 year event.
- Stormwater detention facilities to limit the peak discharge rate to pre-development levels during the 1:100 year, 24-hour rainfall event.
- An erosion and sediment control plan.

Note, this study is limited to the development boundary and is not indented to assess outlying areas of the Dimsdale Lake watershed.

1.4 ANTECEDENT CONDITIONS

The proposed development spans approximately 1,050 hectares, including the existing lots and Dimsdale Lake. About half the area drains to Dimsdale Lake or its outlet watercourse, with the remainder draining overland to the south of the property. The majority of the proposed development is currently used for agricultural purposes and has gently rolling slopes. The remaining portion of the site is developed as industrial and single family lots, concentrated to the southeast of Dimsdale Lake. From aerial photos, it appears some of the agricultural lands maintain dugouts for irrigation storage. Refer to Figure 1 for a location plan.

Based on the agricultural nature of the land, soils are expected to be moderately to well drained. Natural drainage courses have been identified by aerial photography and contour maps with inlets to Dimsdale Lake from the north and west, discharging to the west. Approximate flow paths were determined from contours and assumed road grading.

2 STORMWATER FLOW MANAGEMENT

All flow calculations and analysis of the post-development condition for determination of flow characteristics were undertaken using the United States Environmental Protection Agency (EPA) Stormwater Management Model (SWMM), version 5.0. SWMM is a dynamic rainfall/runoff simulation model used for single event or long term (continuous) simulation of runoff quantity from primarily urban areas.

SWMM accounts for various hydrological processes that produce runoff from urban areas. These include:

- Time-varying rainfall
- Infiltration of rainfall into unsaturated soil layers

Subsequent detailed designs of minor collection systems for lots and roads will be undertaken using the Rational Method, in accordance with the County of Grande Prairie Standards.

2.1 STORMWATER CATCHMENTS

2.1.1 PRE-DEVELOPMENT

Pre-development catchments and sub-catchments have been determined from contour information and the existing lot layout. Figure 3 shows the pre-development catchment boundaries and outlet points. Sub-catchments have been created based on land-use plans so that appropriate runoff parameters can be assigned. Generally, grades within the development vary between 1 and 4%. Runoff appears to be overland for the majority of the catchments, becoming concentrated at roadway ditches and watercourses. Contributions from off-site areas are not considered, as the primary purpose of this stormwater management plan is to match post-development flows to pre-development rates for the subject area.

2.1.2 POST-DEVELOPMENT

To analyse the stormwater runoff the proposed development has been divided into catchments based on land use and grading. Figure 2 shows the proposed land-use plan for the Dimsdale area. It is anticipated that all lots will be graded towards roadside ditches that will convey stormwater to detention facilities followed by downstream watercourses. An average slope of 1-2% was assumed for all lot grading. Where possible, existing natural watercourses that feed into Dimsdale Lake have been maintained. Refer to Figure 4 for major post-development catchment boundaries.

2.2 MINOR AND MAJOR SYSTEM

In accordance with the County of Grande Prairie standards, the proposed development will be designed with both a minor and major storm drainage system. The minor system consists of catchbasins and inlet structures, underground piping, ditches, and treatment for runoff up to and including the 1:5 year event. The major system provides controlled conveyance of stormwater runoff up to the 1:100 year event, typically along the developed roadways. The major stormwater network is included on Figure 4.

The major drainage network has been modelled to convey stormwater from subcatchments to the stormwater detention ponds to detain the 1:100 year rainfall event. The layout and sizing of the minor system will be completed during detailed design using the Rational Method. The minor drainage system is not included in the water model, as it does not impact the major drainage system or detention system.

2.3 DETENTION FACILITIES

Generally, stormwater management ponds are proposed to provide both quantity control and quality improvements of runoff from newly developed areas. Either wet or dry ponds can be specified, with wet ponds providing better quality improvements than dry ponds. However, there are some site considerations that may limit the feasibility of wet ponds such as groundwater elevations and site dimensions, as the recommended minimum surface area is 2 ha. Runoff from existing developed areas can also be routed through the ponds, if desired to treat and detain runoff from existing areas. All ponds will be designed to meet Grande Prairie and Alberta guidelines for maximum depth, freeboard, slopes, flow path length, and access for maintenance. Where possible, ponds will be located offline from existing watercourses, so that drainage from upstream areas is unaffected by the development.

2.3.1 DE-CENTRALIZED FLOW MANAGEMENT

In some areas, particularly in the proposed single family areas, centralized detention ponds may not be feasible. Additionally, since the proposed lots are typically large, at about 2 hectares, impervious cover is generally limited and runoff will be mitigated through residential landscaping features. As such, stormwater quality is a greater concern than stormwater detention. Both stormwater quality and quantity management systems can be achieved through any or all of the following methods on a lot-by-lot basis: absorbent landscaping, bio-filtration swales, rainwater cisterns, surface ponding, and green roofs. These areas where centralized detention facilities are not feasible are identified in Figure 4, along with the proposed stormwater management ponds. Any stormwater infiltration facilities implemented on individual development sites may reduce the total amount of detention required.

2.4 STORMWATER MODEL PARAMETERS

A summary of the input values used in the SWMM model are shown in the tables below:

SUBCATCHMENTS

Parameter	Agricultural	Wooded/ Natural	Single Family	Industrial
Percent impervious	0%	0%	10%	75%
Slope	1-4%			
Manning's *n* for impervious areas	0.015			
Manning's *n* for pervious areas	0.20			
Depression storage in impervious areas	0mm			

Parameter	Agricultural	Wooded/ Natural	Single Family	Industrial
Depression storage in pervious areas	2mm		1mm	
Soil group[1]		A		
SCS curve number[2]	60	35	39	39
Rainfall Data				
Storm hyetograph		SCS Type II		
Storm duration		24 hours		
1:100 year, 24 hour total rainfall[3]		100.6mm		

[1] Soil group A refers to soils with a low runoff potential and a saturated conductivity of greater than 3.6mm/hr. Post-construction landscaped areas will be topped with screened topsoil with an adequate depth to support vegetation.

[2] SCS curve number was selected based on developed well-maintained landscaped areas with good grass cover, soil group A for developed areas.

[3] The 1:100 year rainfall total amount is taken from County of Grande Prairie standards

2.5 RESULTS

2.5.1 DETENTION POND SIZING

Runoff was analysed during the 1:100 year, 24 hour rainfall event with total rainfall of 100.6 mm for both pre-development and post-development conditions. An average runoff rate was then determined based on the land use, which is used to calculate the required detention volume. A 1:100 year, 12 hour rainfall event with 76.6mm of total rainfall was also modelled but it was determined that the 24-hour event results in more conservative values for detention. The table below summarizes the model results:

	NATURAL / WOODED	AGRICULTURAL	SINGLE FAMILY	INDUSTRIAL
Average Runoff Rate	3.1 L/s/ha	6.9 L/s/ha	34.3 L/s/ha	194.2 L/s/ha
Detention Required	None	N/A	50 L/ha	430 L/ha

Generally, new development within Dimsdale will target a post-development controlled release of stormwater at 6.9 L/s/ha through detention facilities. This rate of release is in-line with the County of Grande Prairie standards, which provide an estimate of pre-development runoff from undeveloped land of 0.55 to 0.70 $m^3/s/km^2$ (5.5 to 7.0 L/s/ha).

Note: all detention pond sizing assumes no use of on-lot quantity control measures such as absorbent landscaping or infiltration facilities. It is anticipated that as phases of the development are constructed, appropriately sized detention facilities will be included to improve stormwater quality and control the rate of discharge. The top water level of the ponds is to be below all adjacent building floor elevations. Figure 4 shows conceptual detention pond locations based on the post-development

catchments and required detention volumes. While the detention facilities are sized for the 1:100 year rainfall event, some detention is also provided during other rainfall events, thereby improving water quality and mitigating peak flows.

2.5.2 MAJOR OVERLAND FLOWPATH

The expected major drainage system, shown in Figure 4, has been developed based on the proposed road layout and existing contours. In some cases, statutory right-of-ways will be required where the major overland flow path is outside the public ROW; typically along a lot line. Generally, pond inlets will be armoured or asphalt lined to prevent erosion. Pond inlets may also function as a vehicular access route for pond maintenance. During detailed design, the maximum depth of ponding and flow will be determined for the overland flow path. Isolated low points should be avoided where possible to prevent localized flooding. Site grading and local infrastructure in the area should take into consideration the maximum ponding level to mitigate any potential damage from flood conditions. Flooding should be limited to roadways and boulevard areas, and not extend into building envelopes.

3 STORMWATER QUALITY MANAGEMENT

3.1 BEST MANAGEMENT PRACTICES

The Alberta Environmental Protection guidelines recommend water quality measures to effect a minimum of 85% removal of sediment of particle size 75 microns or greater. Minimum treatment capacity for these systems is to be 75 L/s/ha and capable of conveying 150 L/s/ha without re-suspending solids. These goals can be achieved through various on-lot stormwater treatment facilities. Typically, a treatment train using multiple best management practices provides the highest level of pollutant removal and redundancy. Water quality best management practices also typically include some reduction in runoff quantity through infiltration, detention, and evapotranspiration. Any on-lot stormwater quantity reduction results in a 1:1 reduction in the centralized stormwater pond detention volume required.

Following is a summary of some best management practices for stormwater quality that can be implemented on the individual development lots. Selection of on-lot stormwater treatment facilities will be undertaken during detailed design to meet the requirements outlined above.

3.1.1 REDUCE EFFECTIVE IMPERVIOUS AREA

Reducing impervious areas can greatly reduce the total stormwater detention required while also providing groundwater recharge and quality improvements. In some cases, alternate planning standards can be applied to reduce the overall impervious area, such as relaxed parking stall requirements, reduced road widths, and separated sidewalks to allow for infiltration of runoff.

3.1.1.1 GREEN ROOF

Designed to temporarily store and retain rainwater on the roof of a building, water is released from the roof storage at a controlled rate. Rainwater is also taken up by evapotranspiration through plant material maintained on the roof. This option is relatively expensive compared to other detention/treatment systems, as the building must be designed for the increased roof loads brought on by the weight of detained water and snow accumulation. Only flat or very flatly pitched roofs are considered applicable for this method due to the storage volume required. Partial green roofs could be implemented to reduce stormwater runoff, improve water quality, and reduce the heat island effect associated with traditional roofs.

3.1.1.2 POROUS SURFACES

This treatment, which effectively and quickly returns rainwater to groundwater, can greatly reduce the runoff and associated pollutants that would otherwise leave the area as overland flow. These systems are particularly useful in parking lots, roads, and other paved areas that are not subject to high traffic volumes or heavy equipment. Depending on the application, some systems such as porous concrete require regular maintenance if subject to runoff with high amounts of sediment that might clog pores. Paving stone treatment, such as “Aqua Pave” paver stones, are suitable for use in parking areas, and require less maintenance than porous surface treatments.

3.1.2 INFILTRATION FACILITIES

3.1.2.1 RAIN GARDENS, GRASS FILTER STRIPS, & BIOFILTER SWALES

Biofilter systems are used for conveying and filtering stormwater flows, and when used in tandem with sand filters, can return flows for groundwater recharge. These systems can be used in and around parking lots, landscaped areas around buildings, or in other open spaces. They are easily maintainable, can be aesthetically pleasing, and are effective in controlling runoff. Grass filter strips can be used to treat sheet flow directly from impervious surfaces, or concentrated flow can be distributed along the length of the strip with the use of a diffuser trench. Biofilter swales and grass strips can be used in combination with any of the other Best Management Practices.

3.1.2.2 INFILTRATION TRENCHES AND IN-GROUND SYSTEMS

A number of designs are available for infiltration trenches and biofilter swales. Over-sized pipes, either on-line or off-line, can be used to temporarily detain stormwater to meet the planning goals. .

These are below-grade systems designed to collect stormwater from a source and redistribute it into the ground. They typically are designed to capture the first-flush of a runoff event where roof leaders and parking lot drains are directed to the system. These systems are useful for the removal of suspended solids, particulates, bacteria and organics, and will provide groundwater recharge. Geotechnical investigation will be required for any site where the use of these infiltration systems is proposed. Maintenance of these systems will be the responsibility of respective lot owners.

3.1.3 SURFACE DETENTION

As with in-ground detention systems, surface detention intercepts stormwater and releases it at a controlled rate. Surface detention can be in the form of basins, chambers, ponds, or in parking lots. Ponds have some effectiveness in improving water quality, limited mostly to settlement of suspended particles, but this can be improved with the addition of primary settlement chambers. Parking lots can be utilized as temporary storage areas, outfitted with a control device that limits the outflow. Parking areas require a flat grade to attain the storage, and the inconvenience of flooding parking areas warrants consideration when reviewing this option. Using parking lot detention can be considered together with other detention or infiltration options to control runoff from the industrial development.

3.1.4 MECHANICAL OIL/GRIT SEPARATION

The stormwater industry has developed multiple, often proprietary, methods to improve stormwater quality. Likely the best known example is the Stormceptor, which helps to settle out grit and separate oils. Other mechanical means to improve water quality include catchbasin trapping hoods, coalescing plate oil separators, sediment traps, and roof downspout filters. These systems function as intended if they are well maintained, particularly before the seasonal first flush when built up pollutants tend to be suspended and transmitted through the drainage network. Mechanical oil/grit separators will likely be installed with the development to improve stormwater quality.

3.1.5 OPERATIONAL BEST MANAGEMENT PRACTICES

Through regular maintenance, many potential pollutants can be intercepted prior to entering the stormwater network. As previously noted, regular maintenance of mechanical oil/grit separation will help avoid re-suspension of pollutants. Additionally, regular street cleaning, catchbasin cleaning, landscaping maintenance, and spill prevention measures will greatly improve downstream water quality.

4 CONSTRUCTION ACTIVITIES

The following guidelines have been developed for land development projects. A detailed erosion and sediment control plan will be prepared during detailed design based on proposed site grading and staging. The selected Contractor will also be responsible to maintain all reports, documents, and plans, as required by the applicable Municipal, Provincial, and Federal regulations.

4.1 ENVIRONMENTAL MONITORING

4.1.1 MEETINGS AND COMMUNICATION

The monitor will meet with the Construction Superintendent for the site to establish appropriate lines of communication. The monitor will also meet with subcontractors, other field staff, environmental agency representatives, key stakeholders and other engineering staff associated with the project where required. The monitor will also identify a City designate who will be advised should a problem arise on the site.

The monitor will be available by phone 24 hours a day. The phone number will be provided to a number of individuals, such as the Construction Superintendent and the City designate, and will be posted at the site.

4.1.2 MONITORING PRIOR TO AND DURING SITE CLEARING

The monitor will be responsible for the following activities prior to and during site clearing:

- Examining construction areas prior to commencement of work to identify sensitive areas where adverse effects may occur to ensure that they are adequately delineated;
- Making contractors aware of environmentally sensitive areas in advance of construction activities and assisting in the development or modification of appropriate mitigation measures, if necessary;
- Reviewing vehicle access points to the site and the sediment control structures at these points prior to the start of clearing;
- Providing information and advice to project staff and contractors about construction matters related to environmental issues;
- Preparing site inspection field notes, and routinely taking photographs (and where necessary video) to record conditions;
- Acting as a liaison with the environmental agencies; and,
- Reviewing the sediment control structures proposed during construction.

4.1.3 DRAINAGE AND SEDIMENT CONTROL

The environmental monitor will review the proposed sedimentation control plan proposed for the site with the site Contractor prior to construction activities. The monitor will be on site during construction of the sediment control system (SCS). It is understood that the Construction Superintendent will be

responsible for ensuring that the SCS is maintained and working adequately to control all discharges from the site. The Contractor's responsibilities will include inspection and maintenance of the SCS.

During construction, the responsibility of the monitor will be to:

- Examine the adequacy of the sedimentation and control works in achieving acceptable sediment levels as recommended by DFO/MoE guidelines (i.e. total suspended solids and turbidity) discharged from the site;
- Instruct the Construction Superintendent as to the site requirements and design specifications of sediment control structures and complete inspections of such structures on a routine basis, particularly during periods of inclement weather;
- Review placement of sand, gravel and materials (e.g. hydroseed and mulch) specified to control erosion in exposed areas;
- Require that works be stopped in the event of malfunctions of the sediment control system or contravention of discharge limits;
- Review that runoff is diverted from cleared areas by use of swales or low berms and that runoff is routed to the appropriate sedimentation control structures. In environmentally sensitive or problem areas, the monitor will inspect the installation and maintenance of sediment control structures;
- Review stockpiling methods for excavated materials to check that they are placed in appropriate locations and stored properly (e.g. covered with tarps); and,

Recommend mitigation measures and expeditious implementation if activities are found to have the potential for environmental impact or poor water quality runoff.

4.1.4 CONTROL OF DELETERIOUS SUBSTANCES ON THE DEVELOPMENT SITE

The monitor will review housekeeping practices on site (e.g. daily clean-up, use of disposal bins) and review for proper use, storage and disposal of deleterious substances and associated containers. This necessitates that the monitor be aware of all such substances used on site. Any spillage of fuels, lubricants or hydraulic oils should be immediately reviewed by the monitor to determine if additional remedial measures are required and, if necessary, implemented expeditiously.

4.1.5 WATER QUALITY MONITORING

The monitor will sample water for turbidity and/or total suspended solids upstream and downstream of in-stream construction areas. During construction within the riparian zone there will also be a requirement to test water for oil and grease and extractable petroleum hydrocarbons if these are observed in the sedimentation ponds. In addition, the monitor will regularly examine the downstream wetland for the occurrence of poor quality site runoff. Should there be a need for pouring concrete near the watercourse, pH will be tested routinely.

4.1.6 FREQUENCY OF SITE INSPECTIONS

From late fall to early spring (October to March) site inspections will occur as required, weather permitting. Should a heavy rainfall event occur the site will be visited. During the drier months (April to September) the site will typically be visited every 10 days to two weeks (two to three times per month).

During any in-stream works, the environmental monitor will visit the site on a daily basis.

4.1.7 REPORTING

The monitor will provide environmental monitoring summary reports which will be submitted to the following:

- The County of Grande Prairie
- The Developer/Owner;
- The Contractor

The monitor will also complete an environmental completion report at the end of the construction phase, which will outline the major construction activities in relation to environmental issues, significant concerns encountered during the project and mitigation measures used to deal with those concerns.

4.2 SEDIMENT AND EROSION CONTROL PLAN

Heavily silt-laden runoff from the site could have a negative impact on the health of the Dimsdale lake and its ecosystem. Appropriate measures to control sediment and erosion should be undertaken to avoid environmental damage. The sediment and erosion control plan below is a baseline for mitigation measures to be undertaken by the Contractor.

The most important part of any Erosion and Sediment Control Plan is to proactively minimize the erosion potential on a site which will reduce the need for reactive sediment control measures. Once trees and understory vegetation is removed runoff velocity increases and water infiltration into the soil decreases. Once the site has been grubbed soils are exposed which then become susceptible to erosion by weathering agents like rain and wind. Erosion controls must always be the primary control implemented on a construction site. They are typically effective at preventing erosion and require minimal maintenance. The following outlines erosion control measures that will be in place for the duration of construction until lots are ready for building construction and landscaping has been completed.

4.2.1 CONSTRUCTION PHASE

The sediment and erosion control plan should consist of the following elements:

- To the extent possible, site clearing and grading will be scheduled for the dry weather period (summer), when the potential for surface runoff to erode exposed soils is lowest. As much as possible, the clearing and grading operations will be staged to avoid having large areas of disturbed soil present at any time, and particularly during the winter;
- Site clearing should immediately precede construction to minimize the amount of time that disturbed soils are exposed to weathering. Clearing will be limited to the minimum area necessary for construction;
- If any soil or other erodible material is to be stockpiled for more than seven days, it will be covered with polyethylene sheeting that is anchored securely to prevent displacement by wind.
- Where necessary, sedimentation ponds and silt fencing will be used to retain sediments on the construction site. The design engineers will determine the appropriate sizes and locations of settling ponds;
- The sediment control structures will be installed as the first construction activity. All sediment control structures will be inspected regularly, and repaired/maintained as necessary;

- Ditches and/or berms will be installed as necessary to direct surface runoff away from disturbed areas. The ditches will be designed to prevent erosion due to high water velocities through the use of check dams (sandbags), filter fabric, rock rip-rap or polyethylene lining. Apart from these necessary diversions, the natural drainage patterns will be maintained;
- New internal roadways that are slated for use and are soil covered should have clean rock travel surfaces to limit movement of fines around the site by vehicles. This is especially important if vehicles are frequently entering and leaving the site. By covering roadway surfaces with gravel the underlying soil is protected and will not be transported around the site. Vehicles and equipment must stay on the gravel roadways to prevent tracking of soil onto the clean surfaces. If roadways become covered with soil then the gravel must be scraped off and a new layer of clean gravel applied. A centralized construction parking lot should also be created to keep all workers parked on a gravel surface rather than randomly spread across the site on soiled areas;
- Catchbasins and stormwater inlets should be protected from construction on this site by installing catch basin inserts or filter cloth. In addition, as catch basins are installed on the site they must also be protected until such time that all internal roadways are completely paved. Catch basin filters require frequent inspection, especially during rain events, to ensure they are not blocked with sediment.
- Sediment and erosion control materials will be stockpiled on site for use in any emergency situation that may arise. Stockpiled materials will include filter cloth, hay bales, rip-rap, grass seed, drain rock, culverts, matting polyethylene, etc.; and,
- As soon as practical after construction, any remaining disturbed soils will be re-vegetated using an appropriate grass seed mixture. Seeding will be conducted before the end of the growing season to enhance root development.

4.2.2 POST-CONSTRUCTION PHASE

Any on-lot ground water infiltrator systems will allow for the separation of sediments and prevent pollutants from mixing with surface runoff. The infiltrator systems will be regularly inspected and, where necessary, cleaned.

The stormwater best management practices are targeted at collecting sediment and erosion and maintaining water quality. Road runoff can be directed to bio-swales where suspended solids can settle out. Bioswales will be vegetated with indigenous wetland plants. For a period after construction, a water quality sampling program would be beneficial to ensure that water quality leaving the development will not negatively affect downstream watercourses.

If, by chance, a slope failure does occur, actions to remedy the failure should be undertaken immediately. The newly exposed soil should be immediately stabilized and perimeter sediment control measures must be installed to catch and filter any turbid water before it reaches a watercourse. Once the impacted slope has been re-stabilized, further measures should be taken to prevent erosion and re-failure. This can be accomplished by either hydroseeding or hand broadcasting seed over the area. Cocoa matting or equivalent should then be installed on top of the area and securely anchored with stakes.

4.3 SPILL CONTINGENCY PLAN

The goal of a spill contingency plan is to have steps outlined so that employees can respond to an emergency spill quickly and safely. This plan should be posted in easily accessible areas and

employees should be familiar with the plan. The Contractor will prepare a site-specific spill contingency plan for all work to be undertaken on the site.

4.3.1 SPILL PREVENTION PLAN

The spill prevention plan consists of the following elements:

- Construction staging areas should be located at least 30 m away from all aquatic features on the site;
- Activities that carry a risk of a material spills should take place within a bermed staging area. These activities include mixing of concrete and/or other materials, vehicle and equipment fuelling, and/or maintenance of any equipment that is done on site;
- Mobile construction equipment should be fuelled, lubricated and serviced only at approved locations;
- Field servicing of equipment, particularly near aquatic features should not be permitted. In addition, equipment should not be washed near aquatic features;
- Areas where fuel or other potentially deleterious substances are stored should be equipped with impervious containment berms. If fuel tanks larger than 250 L are present within a berm, the bermed area should have a holding capacity equal to 125% of the capacity of the largest tank;
- Storage and maintenance facilities should have spill clean-up and disposal equipment. They also should have Medical Safety Data Sheets (MSDS) for all hazardous substances, a list of emergency contact names and telephone numbers, and a written list of emergency response and spill reporting procedures;
- If a spill does occur, it should immediately be reported to the environmental monitor and to the Alberta Provincial Emergency Program. Written notification should follow within two weeks of the verbal report;
- If a spill does occur, site personnel should immediately take steps to stop the discharge (if possible). As quickly as possible, they should contain the spill, clean up the affected area and dispose of waste materials at an approved disposal site;
- All hydraulic, fuel and lubricating systems should be in good repair;
- Equipment should be inspected before commencing work. Equipment with leaks should not be permitted to work near an aquatic feature. Any equipment that develops a leak should immediately be removed from site and repaired;
- Before commencing work, all equipment should be steam cleaned to remove oil, grease and other substances deleterious to aquatic life and,
- Equipment working near aquatic features should use only biodegradable hydraulic fluid.

4.3.2 SPILL RESPONSE PLANS

The Spill Contingency Plan will contain a separate spill response plan. The plan will be in writing and kept in a binder at the appropriate location (e.g., construction trailer and other location(s) where potentially deleterious materials are stored or used). All pages of the spill response plan(s) will be numbered and dated for referencing and updating. At a minimum, each binder will contain:

- A copy of the Spill Reporting Regulation (which includes a list of substances and spill volumes that must be reported).
- A list of the information that should be provided when reporting a spill:
  - Reporter's name and telephone number;
  - Name and telephone number of person who caused the spill;
  - Location and time of the spill;
  - Type and quantity of the substance spilled;
  - Cause and effect of the spill;
  - Details of action taken or proposed;
  - Description of the spill location and surrounding area;
  - Names of agencies on the scene;
  - Names of other persons or agencies advised concerning the spill.
- A list of 24-hour emergency contacts for the project (e.g. site engineer, environmental monitor, construction supervisor, environmental monitor): names, job titles and telephone numbers.
- A list of other relevant 24-hour emergency contacts and a description of the circumstances under which they should be contacted.
- A list of the substances most likely to be involved in a spill or incident;
- The Material Safety Data Sheets (MSDS) for all potentially deleterious substances stored on site and clean-up instructions for each substance or class of substances.
- A list of the spill response equipment on site along with a map of where it is stored.
- A description of potential environmental impacts should a spill occur.
- A detailed site map that identifies areas of particular concern with respect to environmental impacts, such as probable flow pathways to watercourses.

Detailed instructions for preventing/mitigating environmental impacts, such as containment measures for spills that have entered watercourses.

This report entitled Stormwater Management Report, Dimsdale Alberta, Revision 1, dated February 24, 2015 is respectfully submitted by,

WSP

Jeff Somerville, P.Eng.
Design Engineer

Harry Verstraaten, Eng. L., A.Sc.T.
Review Engineer

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Appendix A

FIGURES

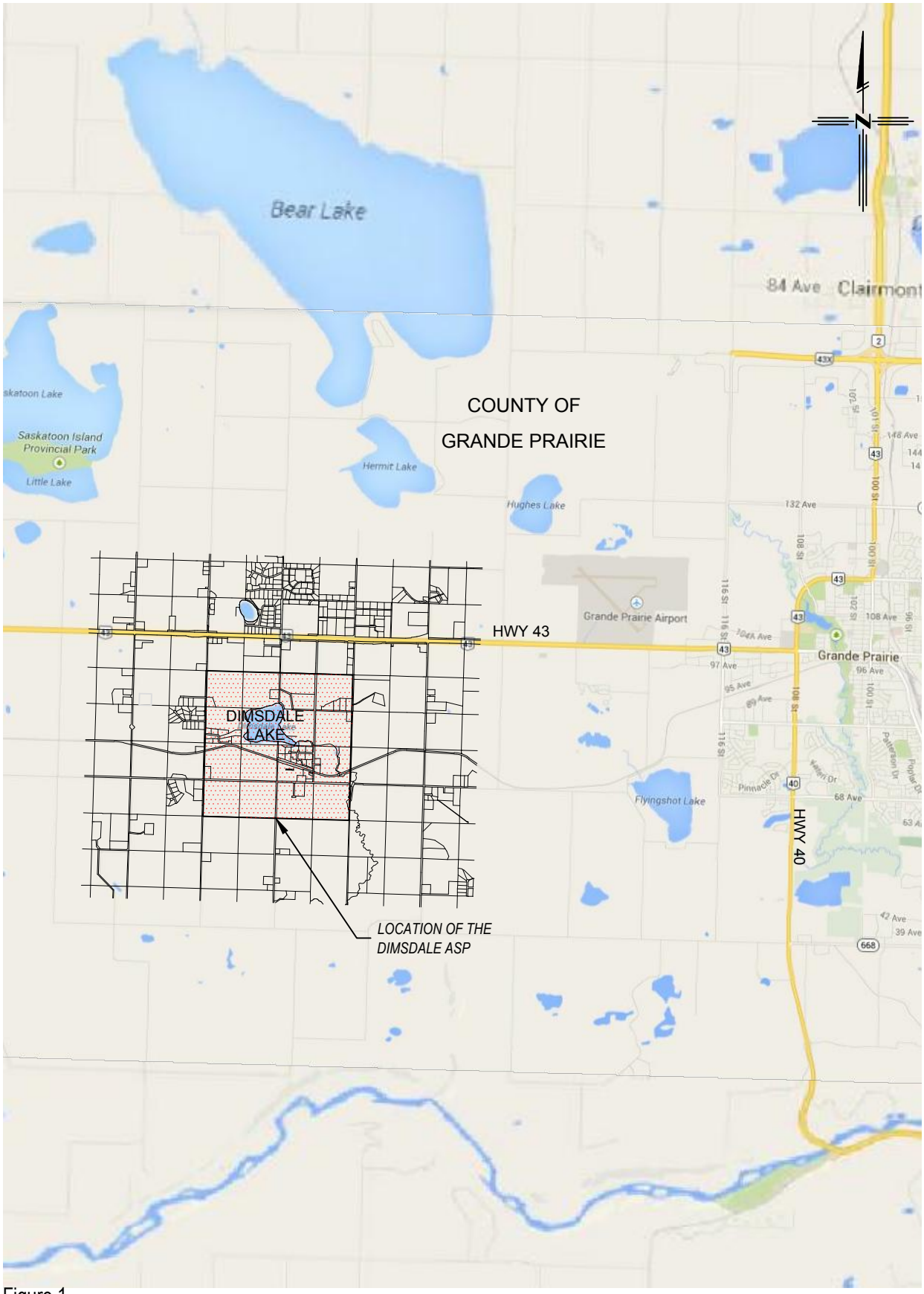

Figure 1
Location Plan
Dimsdale ASP Stormwater Management Plan

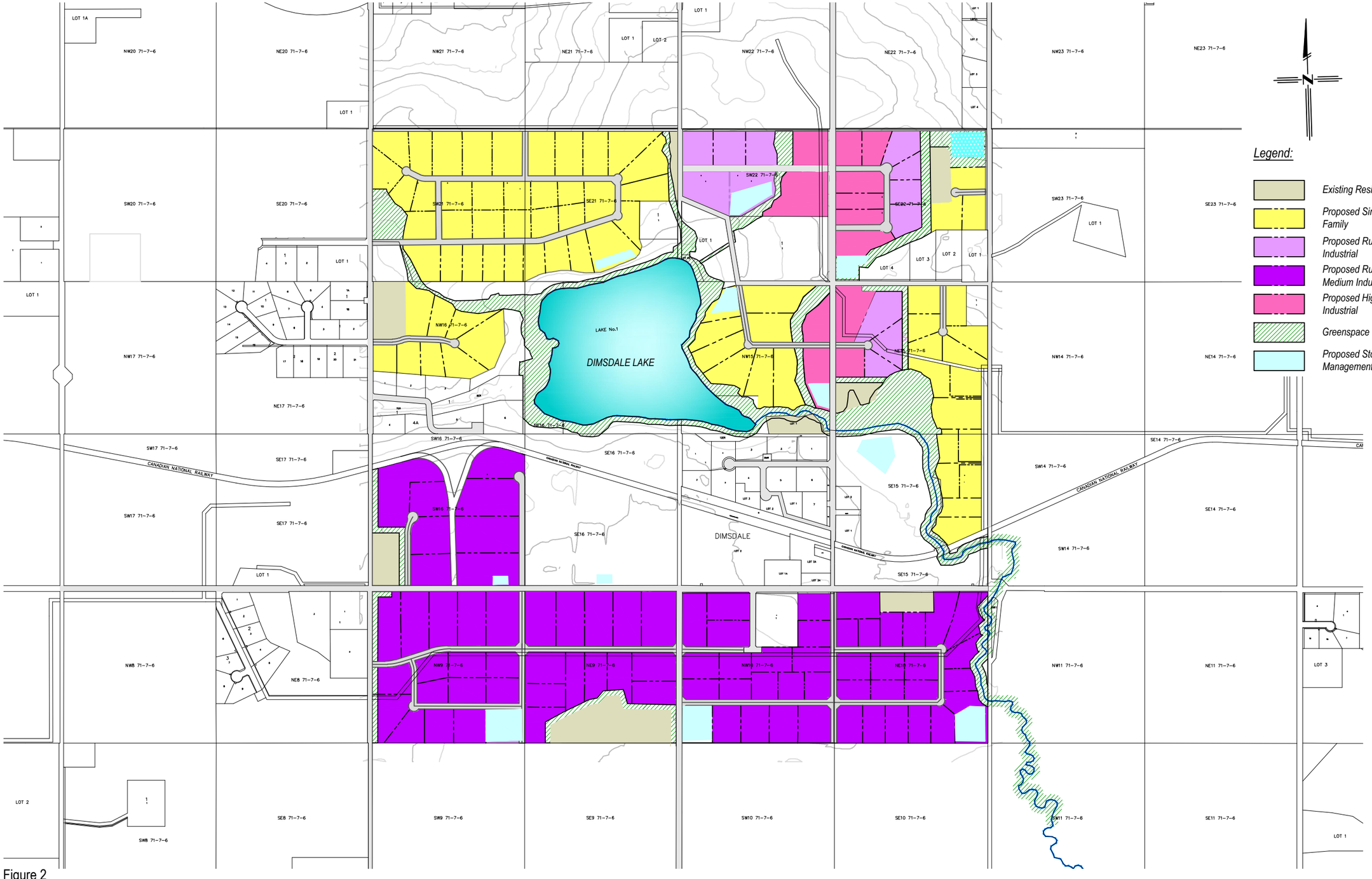

Figure 2
Proposed Land Use
Dimsdale ASP Stormwater Management Plan
NTS

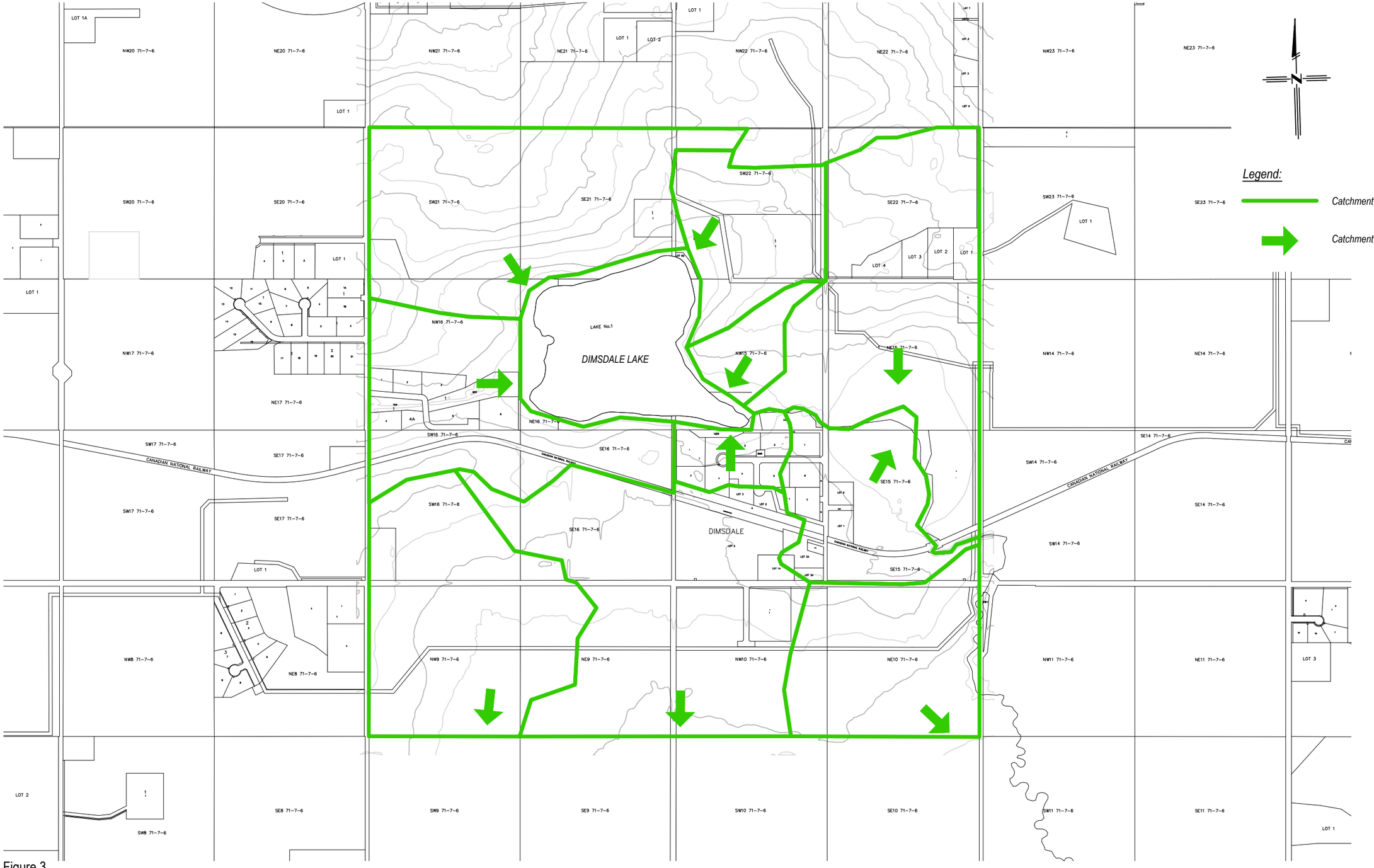

Figure 3
Pre-Development Catchment Areas
Dimsdale ASP Stormwater Management Plan
NTS

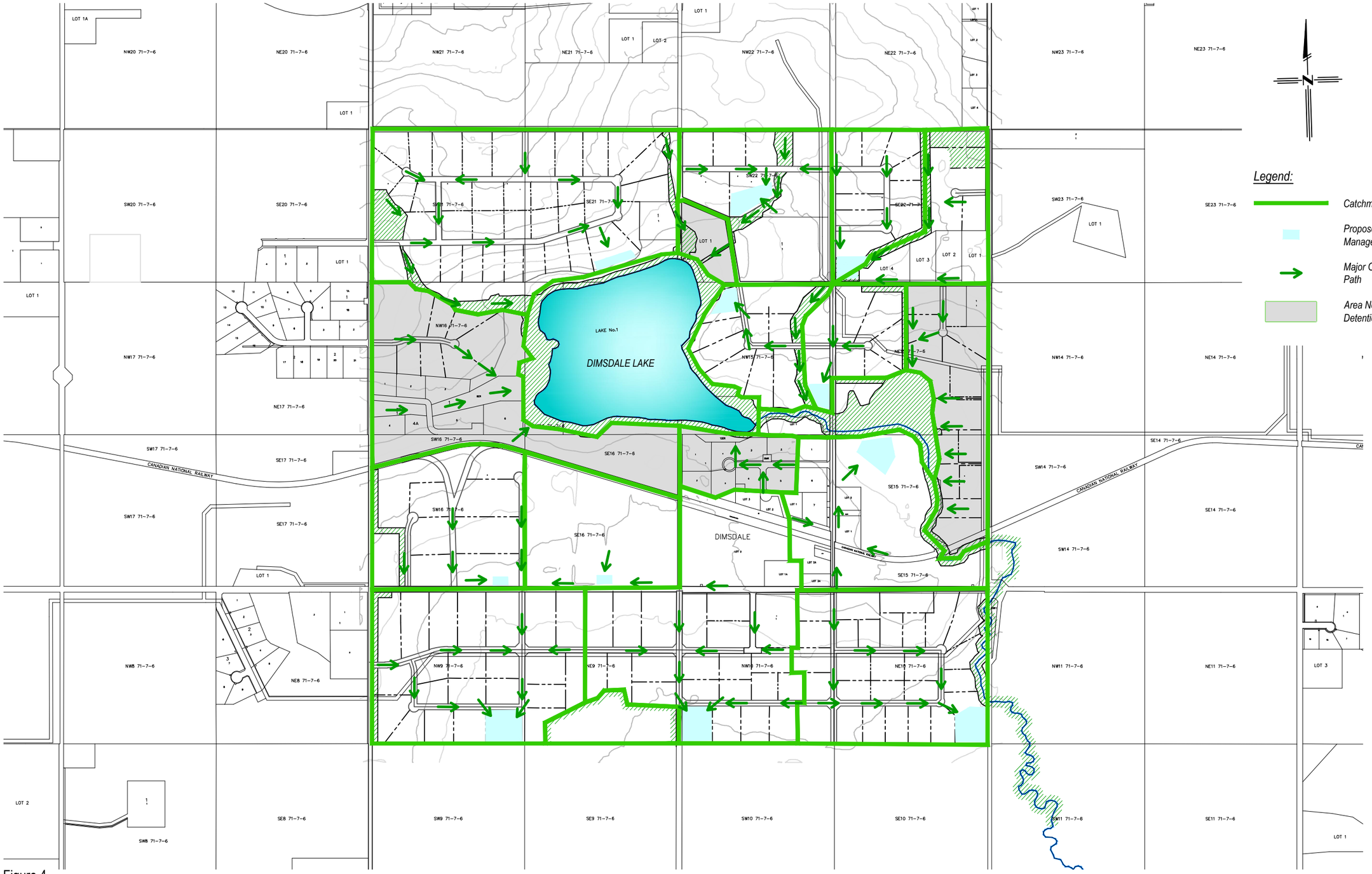

Figure 4
Post-Development Catchment Areas and Major Flowpath
Dimsdale ASP Stormwater Management Plan
NTS