



CALGARY METROPOLITAN REGION EXISTING WATER & WASTEWATER SERVICING & REGIONAL POTENTIAL

November 2019

Prepared for:

Calgary Metropolitan Region Board
602 11 Ave SW Suite 305,
Calgary, AB T2R 1J8

Prepared by:

Urban Systems Ltd.
Suite 101, 134 - 11 Avenue SE,
Calgary, AB T2G 0X5

4626.0002.01 www.urbansystems.ca

This report is prepared for the sole use of the Calgary Metropolitan Region Board. No representations of any kind are made by Urban Systems Ltd. or its employees to any party with whom Urban Systems Ltd. does not have a contract.
© 2019 URBANSYSTEMS®

Table of Contents

Executive Summary	4
Glossary	6
Acronyms	6
1 Intent	7
2 Service Areas	8
2.1 Population Projections	8
2.1.1 Service Area Population Projections	8
2.1.2 Service Areas Not Included	10
2.2 Service Area Demands and Flows	10
3 Existing and Potential Regional Systems	11
3.1.1 Potential Regional Systems	11
3.2 Water Treatment	11
3.2.1 Water Treatment Systems Not Included	12
3.3 Water Licencing	13
3.4 Water Corridors	15
3.4.1 Water Corridors Not Included	16
3.5 Wastewater Treatment	17
3.5.1 Wastewater Treatment Systems Not Included	18
3.6 Wastewater Corridors	18
3.6.1 Wastewater Corridors Not Included	19
4 Analysis	20
4.1 Water and Wastewater Inventory Maps	20
4.2 Water Treatment	23
4.2.1 Existing Capacity vs. Existing Population	23
4.2.2 Existing Capacity vs. 20-Year Population	23
4.2.3 Existing Capacity vs 2076/Buildout Population	23
4.3 Water Licence	29
4.3.1 Annual Water Licence vs. Existing Population	29
4.3.2 Annual Water Licence vs. 20-Year Population	29
4.3.3 Annual Water Licence vs. 2076/Buildout Population	29
4.4 Water Corridors	35
4.4.1 Existing Capacity vs. Existing Population	35
4.4.2 Existing Capacity vs. 20-Year Population	35
4.4.3 Existing Capacity vs. 2076/Buildout Population	35
4.5 Wastewater Treatment	41
4.5.1 Existing Capacity vs. Existing Population	41
4.5.2 Existing Capacity vs. 20-Year Population	41
4.5.3 Existing Capacity vs. 2076/Buildout Population	41
4.6 Wastewater Corridors	47

4.6.1	Existing Capacity vs. Existing Population	47
4.6.2	Existing Capacity vs. 20-Year Population	47
4.6.3	Existing Capacity vs. 2076/Buildout Population	47
5	Summary of Findings.....	53
5.1	Water Treatment	53
5.2	Water Licence	54
5.3	Water Corridors	55
5.4	Wastewater Treatment	56
5.5	Wastewater Corridors	57
6	References.....	58

Tables

Table 1 - Service Area Population Summary	9
Table 2 - Water Treatment Plant Infrastructure Summary	12
Table 3 - Water Licence Annual Diversion Volume Summary	14
Table 4 – Water Corridors Infrastructure Summary	16
Table 5 - Wastewater Treatment Plant Infrastructure Summary	17
Table 6 - Wastewater Corridors Infrastructure Summary	19

Figures

Figure 1 – Existing Water Corridors & Treatment Plants	21
Figure 2 – Existing Wastewater Corridors & Treatment Plants	22
Figure 3 - Water Treatment Existing Capacity vs Existing Population	25
Figure 4 - Water Treatment Existing Capacity vs 20-Year Population	26
Figure 5 - Water Treatment Existing Capacity vs Buildout Population	27
Figure 6 – Water Licence Capacity vs Existing Population	31
Figure 7 – Water Licence Capacity vs 20-Year Population	32
Figure 8 - Water Licence Capacity vs Buildout Population	33
Figure 9 - Water Corridors Infrastructure Existing Capacity vs Existing Population.....	37
Figure 10 - Water Corridors Infrastructure Existing Capacity vs 20-Year Population	38
Figure 11 - Water Corridors Infrastructure Existing Capacity vs Buildout Population	39
Figure 12 - Wastewater Treatment Infrastructure Existing Capacity vs Existing Population.....	43
Figure 13 - Wastewater Treatment Infrastructure Existing Capacity vs 20-Year Population	44
Figure 14 - Wastewater Treatment Infrastructure Existing Capacity vs Buildout Population	45
Figure 15 - Wastewater Corridor Infrastructure Existing Capacity vs Existing Population	49
Figure 16 - Wastewater Corridor Infrastructure Existing Capacity vs 20-Year Population	50
Figure 17 - Wastewater Corridor Infrastructure Existing Capacity vs Buildout Population.....	51

Appendices

Appendix A: Water Treatment Regional Systems Summary Sheets

Appendix B: Water Corridors Regional Systems Summary Sheets

Appendix C: Wastewater Treatment Regional Systems Summary Sheets

Appendix D: Wastewater Corridors Regional Systems Summary Sheets

Appendix E: Service Area Summary Sheets

Executive Summary

The Calgary Metropolitan Region Board (CMRB) has a mandate to complete a Growth Plan and Servicing Plan for the Calgary Metropolitan Region (CMR) by December 2020. As part of the Servicing Plan development, the CMRB is undertaking inter-related studies of five Complexities that were identified as part of the CMRB Water Roadmap. The complexities focus on existing water and wastewater servicing, demand management, natural and managed capacity of supply, regulation and policy, and water quality. In addition, a background report on stormwater is currently underway.

The Calgary Metropolitan Region Board (CMRB) administration commissioned this study to provide information for the Intermunicipal Servicing Committee (ISC), the Board and the Growth Plan Consultant to consider in their development of the Growth and Servicing Plan due for the minister by December 2020. The scope of this study is to identify and summarize technical capacity information provided by the members regarding existing water supply, wastewater collection, and treatment infrastructure capacities within the region. This study provides a baseline fact set of the current infrastructure capacities relative to current and projected demands (expressed in population equivalents) from the areas currently served by these water and wastewater systems.

Water and wastewater infrastructure capacity (including location, size and material type) was compiled to prepare an inventory of existing servicing infrastructure within the Calgary Metropolitan Region (CMR) that may have potential regional significance. Infrastructure capacity shown in this report is based on information provided by the municipalities and/or included in existing technical studies. The capacities noted herein rely on current or best available information provided by the member municipalities regarding their infrastructure in order to provide a comparison of the design or existing system capacity with the current and projected demand needs. Where capacity information was not provided or available in provided reports, assumptions have been made and are identified accordingly in the report.

The following three timeframes are used in this study to compare current infrastructure capacity to service area demands:

- Existing (2019) Demand;
- 20-year (2039) Demand; and
- 2076/Buildout Demand.

2076 was used as a “buildout” timeframe as many of the long-term servicing studies and master plans provided by the members considered growth to 2060 or 2076 for their service areas, so this ensures consistency with population projections between this study and others. Population projections used for urban municipalities were provided in the report titled “Population Projections for the Calgary Metropolitan Regional Board” (Rennie Intelligence, 2018), which was adopted by the CMRB and provided for use in this study. For rural municipalities, long-term demand projections are not provided on an area by area basis. In order to project long-term demands for the rural service areas, we have used projected demands for the buildout of the approved Area Structure Plans for the existing service areas.

For each of the three timeframes, infrastructure capacity surplus or deficits are visually represented in the form of heat maps to allow for visualization of the state of capacity of the region's infrastructure for the non-technical reader.

It is important to note that the CMRB population data is not used universally by each individual member municipality for their own long-range planning. Therefore, any conclusions regarding projected demands in this report may differ from that of the members. This study is intended to highlight the areas where more detailed analysis should be undertaken in areas where members determine it is beneficial to collaborate regionally.

The infrastructure analyzed for this study includes water and wastewater treatment plants, water and wastewater corridors (pipelines) and licencing. Infrastructure capacity was generally provided by the municipalities. Where capacity information was not available, assumptions have been made and are identified accordingly in the report. Factors not considered include Master Service Agreement limitations, pumping or lift station capacity, storage capacity, age and condition of infrastructure and operating strategies used by Calgary Metropolitan Region (CMR) members to achieve the service level commitments within their communities. The work herein relies on current or best available information provided by the member municipalities regarding their infrastructure in order to provide a comparison of the design or existing system capacity with the current and projected regional needs.

Water licence information included in this report only includes licenced annual diversion volume, with the exception of the City of Calgary which considers instantaneous withdrawal rates. This analysis does not review other limitations of the licences such as instantaneous withdrawal rates, water conservation objectives, in-stream flow objectives, or licence priority. It also does not include other licensing which may be available in the region. More work is therefore needed to understand the overall physical water supply and evaluate how the region will manage licences with all of their complexities and restrictions over the next 60-year timeframe. In many more than one municipality in the CMR, water licence represents the critical constraint to delivering water servicing in the future. From this baseline fact set, more detailed analysis can be completed on the areas of opportunity to address other restrictions and complexities regarding regional licencing.

Planning for regional servicing depends on many factors over and above the information provided in this report. This report is not a servicing plan, nor indicates any servicing options, which would require rigorous technical study of each of the systems, their demands, technical and operational limitations among many other considerations. The scope of this study is to provide a visual representation of baseline facts for the CMR regarding the existing regional service infrastructure. Therefore, this report should not be utilized to make servicing conclusions. Rather, it forms one piece of a greater discussion regarding regional collaboration, growth areas, sustainable resource management, climate variability, drought and flood resiliency, among others.

This study qualitatively illustrates the current state of regional infrastructure capacity with a view to identifying opportunities for regional collaboration regarding sustainable growth management, as is the mandate of the CMRB. It is acknowledged that actual service capacity depends on a variety of factors that were beyond the scope and schedule of this preliminary assessment.

Glossary

Average Day Demand (ADD): The total volume of water demanded over a year divided by 365 days.

Average Annual Day Flow (AADF): The total volume of wastewater into a plant over a year divided by 365 days.

Maximum Day Demand (MDD): The maximum water consumption during any one day of the year.

Maximum Day Flow (MDF): The largest volume of wastewater flow anticipated to occur during a one-day period, expressed as a daily average.

Population Equivalent (PE): The number expressing the ratio of the sum total of water demands or wastewater flows to the unit demanded (water) or produced (wastewater) by one person.

Service Area: Population centers that are currently serviced by the identified existing infrastructure in this study.

Acronyms

ADD: Average Day Demand

AADF: Average Annual Day Flow

ASP: Area Structure Plan

CMRB: Calgary Metropolitan Region Board

EP/PE: Equivalent Population

ISC: Intermunicipal Servicing Committee

LUC: Land Use Committee

MDD: Maximum Day Demand

MDF: Maximum Day Flow

MLD: Mega-Litres per Day

WTP: Water Treatment Plant

WWTP: Wastewater Treatment Plant

1 Intent

The Calgary Metropolitan Region Board (CMRB) was established in 2018 to provide a mechanism for the member municipalities to collaborate and proactively plan for managed, sustainable growth in the region. Water and wastewater servicing are paramount to supporting growth and the CMR is undertaking a collaborative approach to sustainably manage and plan for growth.

Infrastructure capacity was provided by the municipalities. Where capacity information was not available, assumptions have been made and are identified accordingly in the report. Factors not considered include Master Service Agreement limitations, pumping or lift station capacity, storage capacity, age and condition of infrastructure and operating strategies used by Calgary Metropolitan Region (CMR) members to achieve the service level commitments within their communities. The work herein relies on current or best available information provided by the member municipalities regarding their infrastructure in order to provide a comparison of the design or existing system capacity with the current and projected regional needs.

This project is being completed concurrently with other studies which examine the region's ultimate water demands, water licencing requirements and constraints, and the natural and managed capacity of the Bow River Basin, all of which are not evaluated within the scope of this study. Each of these studies provides a layer of information (not to be read in isolation) with which the Land Use Committee (LUC), the Intermunicipal Servicing Committee (ISC) and the Growth Plan Consultant may utilize to assist the CMRB in identifying opportunities for regional collaboration and synergy.

This report is not a servicing plan, nor does it indicate any servicing options, which would require rigorous technical study of each of the systems, their demands, technical and operational limitations among many other considerations. The scope of this study is to provide a visual representation of baseline facts for the CMR regarding the existing regional service infrastructure. Therefore, this report should not be utilized to make servicing conclusions. Rather, it forms one piece of a greater discussion regarding regional collaboration, growth areas, sustainable resource management, climate variability, drought and flood resiliency, among others.

The following report specifically provides a baseline inventory of existing water and wastewater servicing capacity in the region (represented in population equivalents), as it compares to the needs of the region currently, in 20 years and by 2076. The data is represented visually in order to aid the non-technical reader in identifying opportunities and constraints at a high level.

2 Service Areas

Service areas are defined as population centers that are currently serviced by the identified existing infrastructure in this study. *Potential* future service areas were not considered in this study, as this study focuses on existing infrastructure only, and the areas they currently service. Service areas where the CMR does not have jurisdiction (areas outside of the CMR boundary, First Nation's lands for example) were not analyzed in this study.

The following three timeframes are used in this study to compare current infrastructure capacity to service area demands:

- Existing (2019) Demand;
- 20-year (2039) Demand; and
- 2076/Buildout Demand.

Many of the long-term servicing studies and master plans provided by the members considered growth to 2060 or 2076, so using this timeframe ensures consistency with population projections between this study and others that were produced previously and are underway concurrently.

2.1 Population Projections

Population projections for 2018, 2039 and 2076 (Rennie Intelligence, 2018) were provided by the CMRB for the urban municipalities. It is important to note that the CMRB population data is not used universally by each individual member municipality for their own long-range planning. Therefore, any conclusions regarding growth and demand projections in this report may differ from that of the members due to variations in population projections.

2.1.1 Service Area Population Projections

To determine the current (2019) estimated populations, the 2018 and 2039 populations were interpolated linearly. Where populations were not provided (examples include Black Diamond, Turner Valley, small Hamlets and Villages), 2016 federal census populations were projected to 2019 using growth rates provided by the member municipalities or the CMRB (Rennie Intelligence, 2018). 2039 populations were then projected by interpolating linearly between the buildout population and the 2019 population.

Buildout populations were either taken from approved plans (Area Structure Plans or Municipal Development Plans) or a 2076 projection was calculated using the growth rates provided by the municipality or the CMRB (Rennie Intelligence, 2018).

For areas predominantly commercial and industrial such as Balzac and the Highway 2A Area Structure Plan (ASP) Corridor, the master servicing studies provided the total buildout water demands and wastewater flows, and these were used to calculate an Equivalent Population (EP) for the buildout areas using the per capita residential demand rates or wastewater flow generation rates.

Each of the service areas and their water and wastewater servicing attributes are summarized in Appendix E.

The next table summarizes the estimated 2019, 2039 and 2076/buildout populations for the service areas.

Table 1 - Service Area Population Summary

SERVICE AREA	EXISTING (2019) POPULATION	20-YEAR POPULATION	2076/BUILDOUT POPULATION
City of Calgary	1,363,004	1,839,329	2,414,306
City of Airdrie	68,533	110,761	171,931
City of Chestermere	21,416	40,582	67,766
Town of Strathmore	13,969	22,787	39,101
Town of Cochrane	29,277	42,512	67,813
Town of High River	15,217	23,050	37,542
Town of Okotoks	29,798	45,723	75,183
Town of Black Diamond	2,629	3,028	3,427
Town of Turner Valley	2,317	4,222	6,126
Hamlet of Millarville	44	60	60
Hamlet of Aldersyde, Highway 2A Industrial corridor, Ravenscrest, Silvertip (Equivalent Population)	2,235	6,314	13,861
Heritage Pointe	2,075	2,500	2,500
Cargill (Equivalent Population)	13,626	13,626	13,626
Hamlet of Cayley	369	642	642
Hamlet of Bragg Creek, Elkana	459	1,303	2,147
Harmony	254	7,863	15,726
Balzac West; Balzac East (Equivalent Population)	2,321	18,630	46,589
Hamlet of Conrich	22	5,724	11,427
Hamlet of Cochrane Lake	769	1,260	4,000
Hamlet of Langdon	5,370	7,979	13,400
Elbow Valley	2,970	2,970	2,970
Tsuu T'ina Nation 145	3,212	13,351	13,351
China National Offshore Oil Corporation (CNOOC)	N/A	N/A	N/A
Spruce Meadows	N/A	N/A	N/A

The existing or projected Population Equivalents (PEs) for Elbow Valley were not provided or known by the municipality at the time of the study. An estimated population was used based off the maximum dwelling units permitted within the ASP boundary. If this area is deemed to have significant future growth, additional analysis should be completed to estimate the service area needs in the future.

PE assumptions were provided for Tsuu T'ina Nation by the City of Calgary, as it is difficult to estimate the future growth and demands for this area. As the existing and future service area population equivalents for

Tsuu T'ina are very small in comparison to the total water and wastewater service area, this assumption is adequate for this level of analysis.

2.1.2 Service Areas Not Included

The China National Offshore Oil Corporation (CNOOC) receives water through a direct line from the City of Calgary, and it was agreed to exclude it from the analysis.

Spruce Meadows is a multi-purpose sports facility south of Calgary which receives potable servicing from the City of Calgary. This service area has not been included, and if this area is deemed to have significant future growth, additional analysis should be completed to estimate the demands in the future.

2.2 Service Area Demands and Flows

For urban municipalities and rural residential Area Structure Plans (ASPs), demands and flow projections are represented strictly as population equivalents which are the projected service area populations.

In some rural development areas such as Balzac, Conrich and the Highway 2A ASP area, the total estimated buildout demands and flows were provided in available servicing reports and were then converted to a population equivalent, as these areas are predominantly commercial and industrial.

This was done by taking the total projected average day water demand for the service area (in L/day) and dividing it by the residential per capita water demand (L/c/d) for that area, in order to convert it to an equivalent residential population. The same method was used for projected wastewater flows and per capita wastewater generation rates.

The parameters used to calculate service area demands and flows for each service area is provided in Appendix E.

3 Existing and Potential Regional Systems

Existing regional systems were divided into water corridors (consisting of one or more water pipelines), water supply and treatment (consisting of the river intakes and their associated water treatment plants), water licences (represented only on an annual basis), wastewater corridors (consisting of one or more wastewater forcemains), and wastewater treatment plants. The licences included in the study were provided by member municipalities and are generally compared to the service area projections associated with the water treatment systems that service those populations. Licences are discussed further in Section 3.3.

In the urban municipal context, only publicly owned systems were included in this study. In the rural context there are many systems, some public and many small private. Public systems were inventoried, and only private systems where information was available at the time of the study were considered, such as Harmony. Municipalities do not have jurisdiction over individual co-ops, so incorporating them into the study inventory would require approaching each co-op individually. Therefore, private co-op systems were inventoried and analyzed if the information provided was complete (including the service area populations, projections and infrastructure capacity), even if their regional potential is low.

Only existing infrastructure (constructed), or infrastructure currently under construction is analyzed. Given that growth and capital financing plans can change annually, assumptions made about planned infrastructure capacities before it is committed (meaning in construction) is premature.

3.1.1 Potential Regional Systems

The only potential infrastructure noted (but not analyzed) in the inventory that do not exist are the future Aldersyde WTP and WWTP as these have been approved by Alberta Environment and Parks (AEP). They are not analyzed because they are not under construction but are noted for future analysis should they be built.

3.2 Water Treatment

Water treatment plants (WTPs) current capacities were provided directly by member municipalities. All capacities that are shown in the information sheets in Appendix A are maximum day demand (MDD), and it is assumed that capacities provided are firm capacities, which refers to the capacity of the WTP with the largest piece of equipment from the limiting unit process being out of service. The MDD for each treatment plant is converted to an EP based on the per capita demand characteristics of the contributing service areas. The design maximum day demand in megalitres per day (MLD) is converted to EP using MDD to ADD ratios (MDD:ADD ratios) and the average day per capita demands for each service area. Where a WTP provides treatment to multiple service areas, a weighted average of the contributing per capita unit demands was calculated, and used to convert the WTP ADD in MLD to EP. These WTP service area per capita demands are shown in the Appendix A information sheets.

The table below provides a summary of which water treatment plants have been included in the analysis, which plants have been excluded, and which have been noted for future consideration.

Table 2 - Water Treatment Plant Infrastructure Summary

WATER TREATMENT	EXISTING INFRASTRUCTURE CAPACITY (EQUIVALENT POPULATION)	CURRENT SERVICE AREA
Calgary WTP (Bears paw, Glenmore)	1,624,000	Calgary, Airdrie, Chestermere, Strathmore, Tsuu T'ina Nation, CNOOC ¹ , Spruce Meadows ²
Bragg Creek WTP	719	Bragg Creek, Elkana
Harmony WTP	4,198	Harmony
Langdon WTP	6,554	Langdon
East Balzac WTP (Graham Creek)	10,260	Conrich, Balzac
Horse Creek WTP (Cochrane Lake)	3,640	Cochrane Lake
Cochrane WTP	47,114	Cochrane
Heritage Pointe WTP	3,750	Heritage Pointe
SRRUC WTP	13,096	Turner Valley, Black Diamond, Millarville
Okotoks WTP	40,678	Okotoks
High River WTP	46,669	Town of High River; Cargill; Aldersyde and Highway 2A Corridor; South Cayley; Mazeppa
CalAlta Waterworks WTP		
Westridge Water Supply WTP	Not included in this analysis. Noted for future consideration as infrastructure may have regional potential.	
Rocky View Water Co-op WTP		
Future Aldersyde WTP		
Longview		
Blazer Water Systems WTP	Not included in analysis; was not deemed to have regional potential at the time of the study.	
Blackie		

1. It was agreed at the outset of the study to disregard the China National Offshore Oil Corporation (CNOOC) demands in this analysis, therefore its future population equivalent has not been included in the analysis. It is noted as it does receive service from Calgary WTPs.
2. Projected demands and population equivalents have not been included in the analysis for Spruce Meadows service area as it was not available during the time of the study. At this time, these demands are expected to be low in comparison to the total WTP service demands.

3.2.1 Water Treatment Systems Not Included

The Blazer Water WTP was not considered as the service area demands and projections were not provided. The system currently has a capacity of 2 MLD, so it is significant in continuing to service the immediate surrounding community.

The Rocky View Water Co-op WTP and Westridge WTP were not considered in the analysis, because information was not provided by the owner to Rocky View County (RVC) at the time of the study. Both systems have the potential for servicing large areas in RVC and therefore could be considered in the future for potential service.

The Cal-Alta WTP was not included as the service area existing and projected demands were not provided. However, Rocky View County has indicated it has potential to be expanded to treat over 1,000 acre-feet of raw water (1,233.5 MLD). For this reason, it has been noted on Figure 1 for future consideration.

3.3 Water Licencing

Water licencing is a key consideration in the ability for a water system to provide service to an area. Water licence information was provided by the CMR members for other complexity studies commissioned by the CMRB. Each licence contains a priority number, a total annual diversion volume maximum, a diversion point location, an effluent return location and volume, and some have additional restrictions such as maximum instantaneous withdrawal rates, water conservation objectives (WCOs) and seasonal minimum in-stream objectives (IOs) that must be met in order to use the licence.

This study does not analyze individual licenses nor evaluate the total available water in the region, which is an onerous and complex undertaking. Only licenses that are currently being used for existing water supply and treatment systems identified in Section 3.2 are included in this summary. There are hundreds of licenses within the region, held publicly and privately. This study only lists licenses that are used for existing water supply infrastructure included in this study or licenses that have been identified by the members for future consideration. This study does not examine the potential for future transfer of licenses. The reader is referred to Appendix C, Table 6 (WaterSMART, 2019) for a list of water licenses of potential impact to CMRB members based on their priority, maximum diversion rate and annual allocated volume.

It is important to distinguish the total annual licence volume available from the amount of water that a licence holder is permitted to divert at any given time (instantaneous withdrawal). Licence instantaneous diversion rates can prevent diversion of the licensed annual volume, and this piece has not been evaluated in this study due to schedule and budget constraints. However, it is recommended that a regional study regarding licence opportunities and limitations be undertaken to allow the CMRB to understand the infrastructure requirements to support the region's needs.

Licence volumes shown in the next table may be owned by one member and the water diverted and supplied through infrastructure owned by another member. For example, Strathmore's licence is used by Calgary's WTPs, and Cargill and Foothills County's licences used by High River's WTP. Therefore, the licences in Table 3 are listed with the water supply system that provides the regional servicing. Licences held by individual municipalities or private service areas are listed in Appendix E.

Table 3 - Water Licence Annual Diversion Volume Summary

WATER TREATMENT - LICENCING	ANNUAL DIVERSION ^{1, 4} VOLUME (EQUIVALENT POPULATION)	CURRENT CMR SERVICE AREA
Calgary WTP (Bears paw, Glenmore)	3,309,538	Calgary, Airdrie, Chestermere, Strathmore, Tsuu T'ina Nation, CNOOC, Spruce Meadows
Bragg Creek WTP	3,375	Bragg Creek, Elkana
Harmony WTP	10,705	Harmony
Langdon WTP	7,763	Langdon
East Balzac WTP (Graham Creek)	14,402	Conrich, Balzac
Horse Creek WTP (Cochrane Lake)	10,088	Cochrane Lake
Cochrane WTP	42,933	Cochrane
Heritage Pointe WTP	Unknown	Heritage Pointe
SRRUC WTP	12,997	Turner Valley, Black Diamond, Millarville
Okotoks WTP	31,545	Okotoks
High River WTP	43,926	Town of High River; MD/Cargill; Aldersyde and Highway 2A Corridor; South Cayley; Mazeppa
Westridge WTP ²	8,525	Service areas are not included in this analysis.
Rocky View Water Co-op ²	15,399	Noted for future consideration as licencing may have regional potential and warrants future analysis.
Cal-Alta WTP ²	1,113	Not included in this analysis. The Equivalent Population shown is RVC's allocation from this corridor.
Mountain View Regional Water Services Commission	51,053 ³	Not included in this analysis. The Equivalent Population shown is RVC's allocation from this corridor.
Aqua 7 Regional Water Commission	5,789 ³	Not included in this analysis. The Equivalent Population shown is RVC's allocation from this corridor.

1. The scope of this preliminary study does not evaluate the complexities of licence management, including in-stream objectives (IO), instantaneous withdrawal restrictions, return to river requirements, etc. Annual diversion volume is a first layer of preliminary analysis to provide a visual representation of currently utilized licencing in the region.
2. Westridge, Rocky View Water Co-op and Cal-Alta WTPs were not considered in the analysis as their plant capacity and service area projections were not provided. However, their licences indicate servicing potential and are therefore noted.
3. These are licence allocations converted to PE using 380 L/c/d (Rocky View County per capita demand). They are noted in this section for future consideration.
4. Licences have been converted to population equivalents assuming 90% of the licence is available for the user (10% losses assumed). This assumption has been carried through for all the licences listed in the table.

3.4 Water Corridors

Water corridors refer to regional water conveyance systems between municipalities. The term corridor is used over pipeline, as some corridors have multiple pipelines. To simplify the analysis, the combined pipeline capacity is used to represent the total corridor capacity.

To summarize corridor capacity, information on the design capacity of pipelines was provided by members, typically in L/s or EP. The pipeline design flow is assumed to be maximum day demand (MDD), as peak hourly demands are typically balanced by reservoirs within each municipal boundary. The corridor MDD in L/s was therefore converted to EP using the service area unit demands and their associated MDD:ADD ratios. As is the case with the WTP infrastructure, some corridors deliver water to multiple service areas, so a weighted average of the per capita service area demands was applied in order to determine the EP of the corridor. Appendix B contains infrastructure summary sheets which outline the background data used to estimate corridor capacity.

This study assumes that pipeline capacity provided by the municipality has factored in relevant redundancy, condition and operational considerations. In a few cases, design capacity information was not known or provided. In these cases, theoretical pipe capacity is estimated using the nominal pipe size and assuming a maximum velocity of 1.5 m/s. However, this estimate does not consider other impacts to hydraulic capacity, such as pressure requirements or pipeline condition, which could be a limitation to achieving the theoretical capacity. Therefore, where these estimates were used, it is recommended to undergo a hydraulic analysis of the pipeline if it is deemed regionally significant by the CMR.

The Mountain View Regional Water Services and the Aqua 7 (Kneehill) Regional Water Services Commissions are two water commissions that originate from outside the CMR boundary, and currently service the Towns of Crossfield and Irricana, which are inside the CMR. Rocky View County has an allocation of 19.4 MLD via the Mountain View system and 2.2 MLD via the Aqua 7 system. As the infrastructure details of these systems and their service area projections were not provided during the time of the study, they were not included in the analysis. However, they are noted on the infrastructure overview maps and their licence allocations are included as the Rocky View County water allocation should be noted for future consideration.

This study does not review the internal capacity of any of the CMR members distribution systems. Understanding capacity of regional water corridors from one municipality to another requires an understanding of the capacity of the water provider's infrastructure that connects water treatment facilities to regional lines. This is not within the scope of this study, so though a regional line may have hydraulic capacity, it cannot be assumed from this report whether the provider has capacity to connect to the regional line beyond the current agreement.

The next table summarizes which water corridors have been included in this analysis and which have been excluded. Refer to Appendix B for a summary of facts for each corridor.

Table 4 – Water Corridors Infrastructure Summary

WATER CORRIDORS	EXISTING INFRASTRUCTURE CAPACITY (EQUIVALENT POPULATION)	CURRENT SERVICE AREA
Calgary to Airdrie Water Corridor	85,000	Airdrie
Calgary to Chestermere Water Corridor	67,733	Chestermere
Calgary to Strathmore Water Corridor	103,220	Strathmore ¹
East Balzac WTP to Balzac Corridor	16,008	Balzac
East Balzac WTP to Conrich Corridor	7,716	Conrich
SRRUC – Turner Valley to Black Diamond Corridor	7,264	Black Diamond
SRRUC – Turner Valley to Millarville Corridor	890	Millarville
High River – Cargill Corridor	20,270	Cargill, Hamlet of Aldersyde, Warner, Silvertip, Highway 2A ASP Corridor
High River – Cargill to Aldersyde Corridor	5,055	Hamlet of Aldersyde, Warner, Silvertip, Highway 2A ASP Corridor
High River – Cayley Corridor	2,430	Cayley
Mountain View Regional Water – Crossfield Corridor	51,053	Not included in this analysis. The Equivalent Population shown is RVC's allocation from this corridor.
Aqua 7 Regional Water Commission – Irricana Corridor	5,789	Not included in this analysis. The Equivalent Population shown is RVC's allocation from this corridor.
Calgary - CNOOC Gas Plant Water Corridor		Not included in the analysis.
Calgary - Spruce Meadows Corridor		Not included in the analysis.

1. Rocky View County and Wheatland County can obtain 15% allocation each with a capital cost and maintenance reimbursement to Strathmore from the East Calgary Regional Water Line if desired.

3.4.1 Water Corridors Not Included

The Calgary to Spruce Meadows corridor is not considered as part of this analysis as it was not deemed regionally significant at the time of the study.

The China National Offshore Oil Corporation (CNOOC) receives water through a direct line from the City of Calgary, and it was agreed to exclude it from the analysis.

3.5 Wastewater Treatment

Information on the current WWTP capacity was provided directly by member municipalities and converted to EP. Capacities of WWTPs are dependent on more than hydraulics. Biological loadings are an important consideration in evaluating treatment capacity, which was not a part of this study. This study assumes that the capacity information provided by member municipalities is the firm treatment capacity of their system which considers biological loadings and redundancy factors. It is understood that many systems don't fully use firm capacity, and this should be noted by the reader in the analysis sections. In the comparative analysis, the biological loadings of the service areas were not evaluated, so only hydraulic demand (flow) was compared to the WWTP capacity.

The maximum day flow to average annual day flow ratios (MDF:AADF), were used to convert the capacity from MDF to AADF, and converted to EP. Where a WWTP provides treatment to multiple service areas, a weighted average (AADF) was calculated using the individual service area per capita generation rates to come up with a blended WWTP per capita unit rate that could be applied to convert the WWTP capacity in mega-litres per day (MLD) to EP. Refer to the infrastructure information sheets in Appendix C for how each WWTP capacity was estimated.

It is important to note that the regulatory approval requirements and restrictions to discharge additional effluent (volume and nutrient limits) into water bodies. This may be a limitation to wastewater treatment servicing potential that will need to be considered in more detail following this study.

The next table summarizes which wastewater treatment plants have been included in this analysis, which have been excluded, and which have been noted to have potential on a regional scale.

Table 5 - Wastewater Treatment Plant Infrastructure Summary

WASTEWATER TREATMENT	EXISTING INFRASTRUCTURE CAPACITY (EQUIVALENT POPULATION)	CURRENT SERVICE AREA
City of Calgary - Bonnybrook (North Catchment)	1,128,700	Calgary, Airdrie, Cochrane, Cochrane Lake, Elbow Valley, Tsuu T'ina North
City of Calgary - Pine Creek and Fish Creek (South Catchment)	363,000	Calgary, Chestermere, Tsuu T'ina North
Langdon WWTP	11,016	Langdon, Balzac (East and West), Conrich
Bragg Creek WWTP	1,143	Bragg Creek
Harmony WWTP	2,789	Harmony
Westend (WRSSC) Lagoon	5,212	Black Diamond, Turner Valley
Strathmore WWTP	30,000	Strathmore
Okotoks WWTP	42,194	Okotoks
High River Lagoon	18,548	High River

WASTEWATER TREATMENT	EXISTING INFRASTRUCTURE CAPACITY (EQUIVALENT POPULATION)	CURRENT SERVICE AREA
Bearspaw Regional (Watermark) WWTP	Not included in this analysis. Has been noted for future consideration as infrastructure may have regional potential	
Cayley Lagoon		
Heritage Pointe WWTP		
Longview Lagoon		
Blackie Lagoon		

3.5.1 Wastewater Treatment Systems Not Included

The Bearspaw Regional (Watermark) WWTP was not considered as service area demands and projections were not provided. Rocky View County indicated that the system has the potential to service 1.4 MLD average daily flow, so it is significant in continuing to service the immediate surrounding community.

The Heritage Pointe WWTP, Cayley, Longview and Blackie Lagoons were not considered as they are not considered to have regional servicing potential.

3.6 Wastewater Corridors

Wastewater corridors refer to regional wastewater conveyance systems between municipalities. To simplify the analysis, the combined pipeline capacity was used to represent the total corridor capacity.

To evaluate corridor capacity, information on the design capacity of pipelines were provided by members. Capacity was provided either in the form of maximum design flow of the pipeline, or as EP. The pipeline capacity was converted to EP using the service area unit demands. As is the case with the other infrastructure, some corridors deliver wastewater from multiple service areas. In these cases, a weighted average of the unit flows is applied in order to determine the EP of the corridor.

As for water, this study assumes that pipeline capacity is not limited by pumping infrastructure, as pumps can be added or upgraded in order to deliver the pipeline's maximum hydraulic flow. In a few cases, design capacity information was not known or provided. In these instances, a theoretical pipe capacity was estimated using the nominal pipe size and assuming a maximum velocity of 1.5 m/s. However, this estimate does not consider other impacts to hydraulic capacity, such as pressure requirements or pipeline condition, which could be a limitation to achieving the theoretical capacity. Therefore, where these estimates were used, it is recommended to undergo a hydraulic analysis of the pipeline if it is deemed regionally significant by the CMR.

The below table summarizes which wastewater corridors have been included in this analysis and which have been excluded. Refer to Appendix D for a summary of each corridor.

Table 6 - Wastewater Corridors Infrastructure Summary

WASTEWATER CORRIDORS	EXISTING INFRASTRUCTURE CAPACITY (EQUIVALENT POPULATION)	CURRENT SERVICE AREA
Airdrie to Calgary Wastewater Corridor	81,057	City of Airdrie
Chestermere to Calgary Wastewater Corridor	52,160	City of Chestermere
Cochrane to Calgary Wastewater Corridor	31,418	Town of Cochrane, Cochrane Lake, Springbank School
Cochrane Lake to Cochrane Wastewater Corridor	10,368	Cochrane Lake
East Rocky View Wastewater Corridor (Balzac to Conrich)	27,693	East Balzac, West Balzac
East Rocky View Wastewater Corridor (Conrich to Langdon)	38,671	East Balzac, West Balzac, Conrich
Elbow Valley to Calgary Wastewater Corridor	4,005	Elbow Valley
Spruce Meadows to Calgary Wastewater Corridor	Not included in analysis; was not deemed to have regional potential at the time of the study.	
Bearspaw School to Calgary Wastewater Corridor		

3.6.1 Wastewater Corridors Not Included

The Bearspaw School and Spruce Meadows wastewater corridors were not included in the analysis as information was not provided on the service areas in order to complete the analysis of their servicing potential. It should be noted to the reader however that their flows are included in the WWTP analysis.

4 Analysis

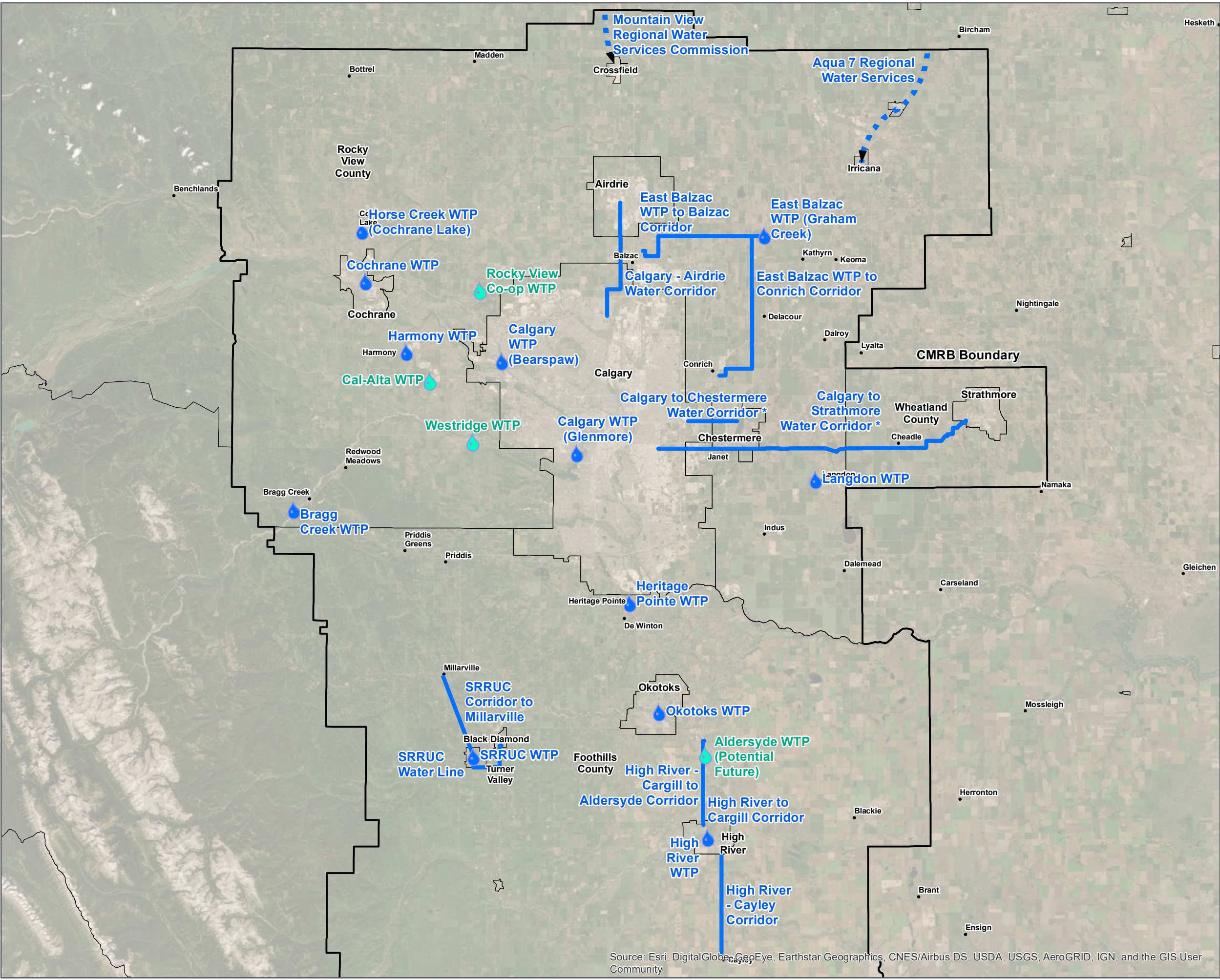
The following analysis compares each infrastructure system against the current, 20-year and 2076/buildout demands for the areas it services. The purpose is to visually represent the current infrastructure capacity within the region and provide a high-level comparison to the projected service area demands.

All the analyses compare demands to existing infrastructure capacity which is defined as infrastructure capacity that is currently in place, or capacity of infrastructure upgrades currently under construction.

4.1 Water and Wastewater Inventory Maps

Figures 1 and 2 include all infrastructure that has been included in the inventory. The maps and inventory include some infrastructure that were not analyzed but may warrant future consideration or discussion. Infrastructure was not analyzed if service area or capacity information was not received, or if they were noted as not having regional servicing potential.

U:\Projects_CAL\4626\0002\011D_Design\GIS\Projects\MXD\Figures 2019\1023\WATER\CMRB_Fig01_Water_Overview_20191023.mxd Last updated by livlikes on November 1, 2019 at 3:48:48 PM



Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

Existing Water Corridors & Treatment Plants

- Legend**
- Water Treatment Plant (WTP)
 - Water Treatment Plant (WTP) Not Included in Analysis (Shown for Future Consideration)
 - Water Corridors
 - Sub-Regional Corridors with Regional Potential

Notes:
Locations are not exact and are for conceptual purposes only.

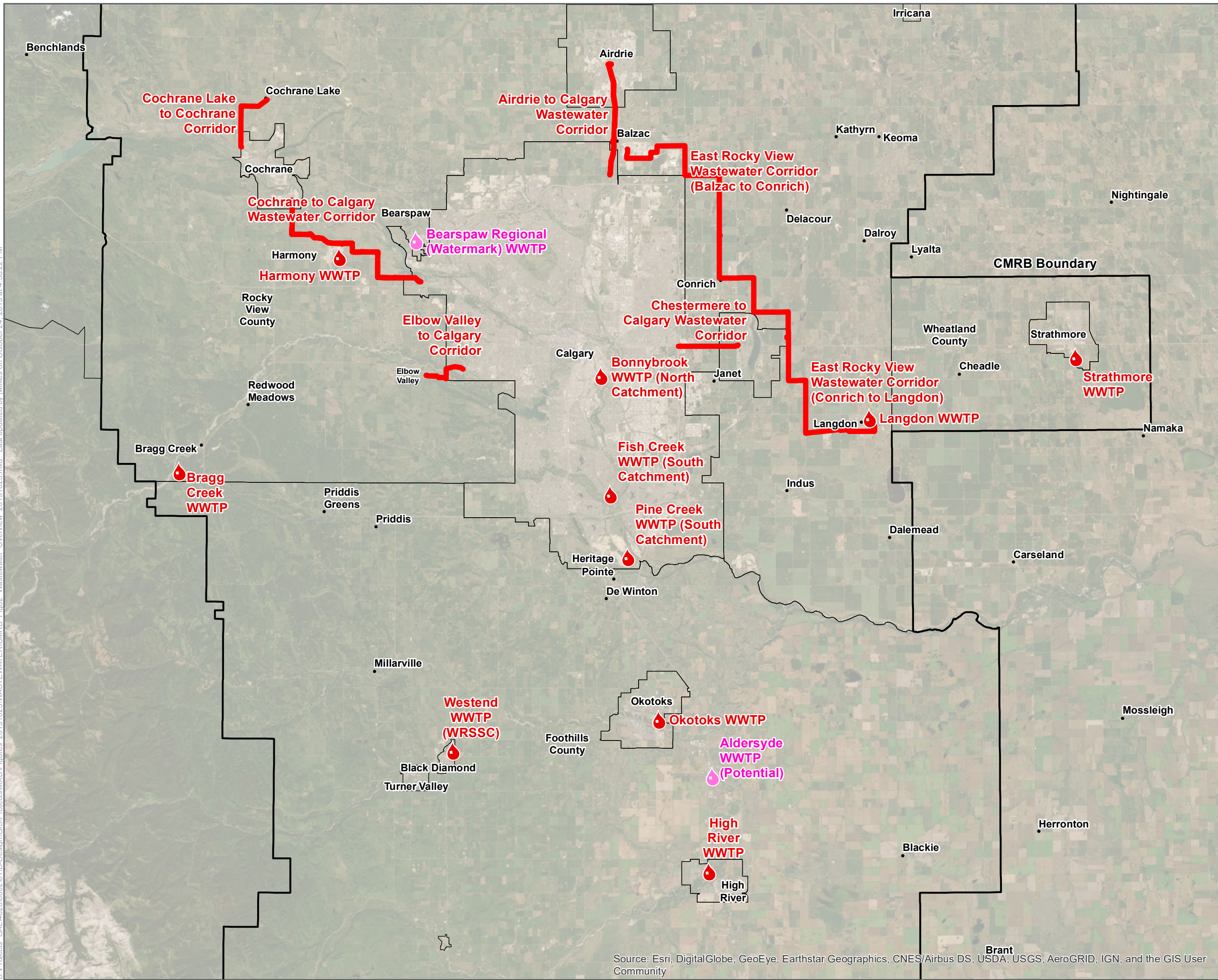
* The water corridor to Chestermere and Strathmore has been shown schematically as two corridors to reflect the allocations of capacity for each municipality.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

URBAN
systems

Scale: 1:450000
Figure 1




U:\Projects_CAL\4626\0002\011D_Design\GIS\Projects\MXD\Figures 2019\1023\WASTEWATER\CMRB Fig02_Wastewater Overview 2019\1023.mxd Last updated by lwilkes on October 24, 2019 at 4:38:22 PM



**Calgary Metropolitan Region
Existing Water and Wastewater
Servicing and Regional Potential**

**Existing Wastewater Corridors
& Treatment Plants**

Legend

-  Wastewater Treatment Plants (WWTP)
-  Wastewater Treatment Plants (WWTP) Not Included in Analysis (Shown for Future Consideration)
-  Wastewater Corridors

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

URBAN
systems

Scale: 1:350000
Figure 2

4.2 Water Treatment

A total of 11 WTPs were included in this analysis. The City of Calgary WTP is shown as one (1) WTP, because the service areas for each plant could not be easily delineated due to the complexity within the distribution system that services all of their customers.

Refer to Section 5 for a summary discussion of the findings of each Figure.

4.2.1 Existing Capacity vs. Existing Population

Figure 3 compares the 2019 population equivalent of the service areas against the existing water treatment infrastructure capacity (in population equivalents) with which they are serviced.

4.2.2 Existing Capacity vs. 20-Year Population

Figure 4 compares the 20-year projected population equivalent of the service areas against the existing water treatment plant capacity. A description of how 20-year populations were projected is available in Section 2.1.

4.2.3 Existing Capacity vs 2076/Buildout Population

Figure 5 compares the 2076/buildout population equivalent of the service areas against the existing water treatment plant capacity. A description of how 2076/Buildout populations were projected is available in Section 2.1.

[This page has intentionally left blank]

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WATER TREATMENT

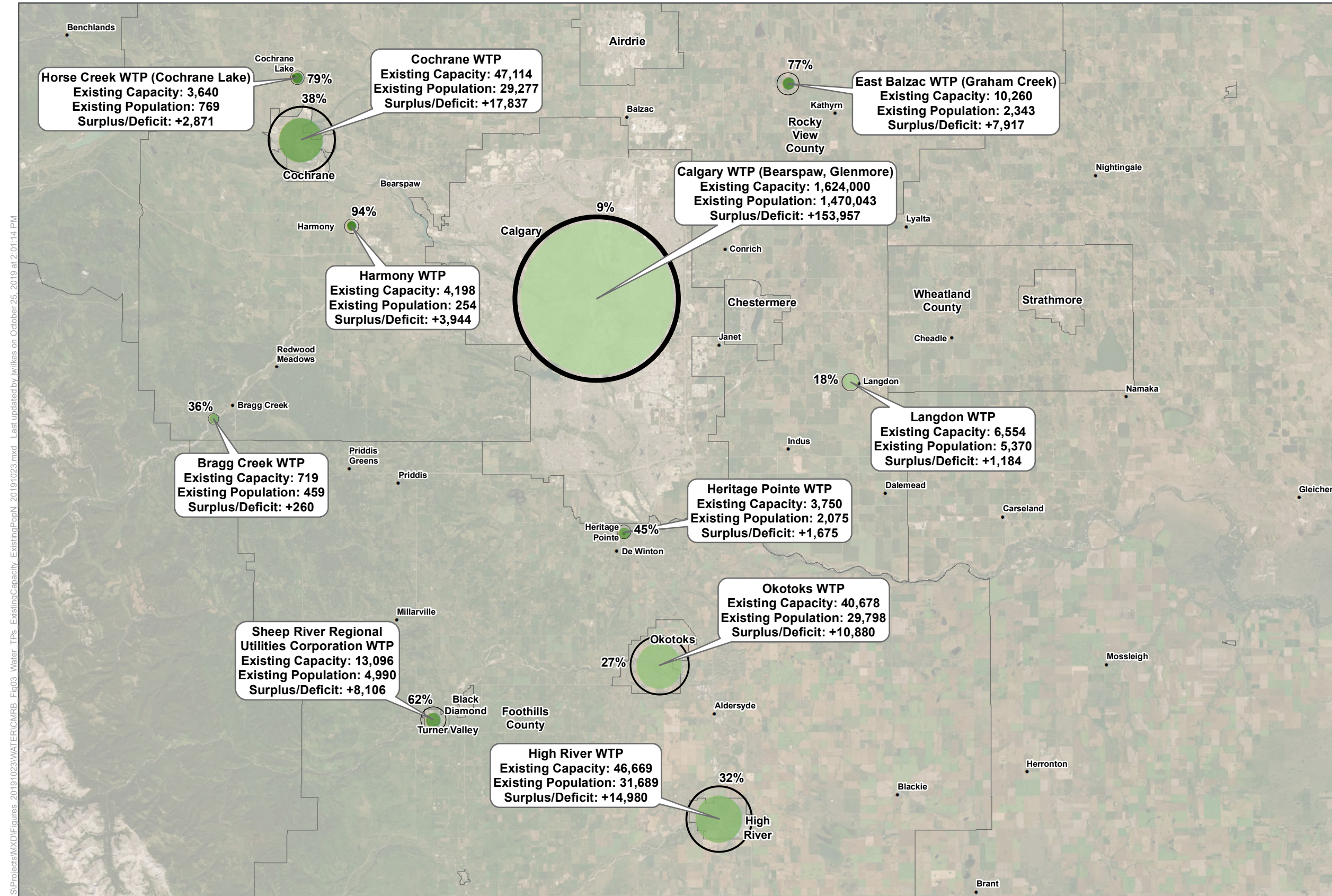
Existing Capacity Comparison: Treatment Infrastructure Existing Capacity vs. Existing Population

Legend

- Existing Population Equivalent
- Existing Capacity Population Equivalent

Surplus/Deficit as Percentage of Treatment Capacity

- 100% (Surplus)
- 0% (Meets Demands)
- 100% (Deficit)



Water Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent	Water License Population Equivalent
Calgary WTP (Bears paw, Glenmore)	1,470,043	2,026,810	2,706,455	1,624,000	3,309,538
Bragg Creek WTP	459	1,303	2,147	719	3,375
Harmony WTP	254	7,863	15,726	4,198	10,705
Langdon WTP	5,370	7,979	13,400	6,554	7,763
East Balzac WTP (Graham Creek)	2,343	24,354	58,016	10,260	14,402
Horse Creek WTP (Cochrane Lakes)	769	1,260	4,000	3,640	10,088
Cochrane WTP	29,277	42,512	67,813	47,114	42,933
Heritage Pointe WTP	2,075	2,500	3,750	Unknown	Unknown
SRRUC WTP	4,990	7,310	9,613	13,096	12,997
Okotoks WTP	29,798	45,723	75,183	40,678	31,545
High River WTP	31,689	43,874	65,913	46,669	43,926

U:\Projects_CAL\46260002\011D_Design\GIS\Projects\MXD\Figures 2019\1023\WATER\MRB_Fig03_Water_TPs_ExistingCapacity_ExistingPopN_2019\1023.mxd Last updated by Wilkes on October 25, 2019 at 2:01:14 PM

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WATER TREATMENT

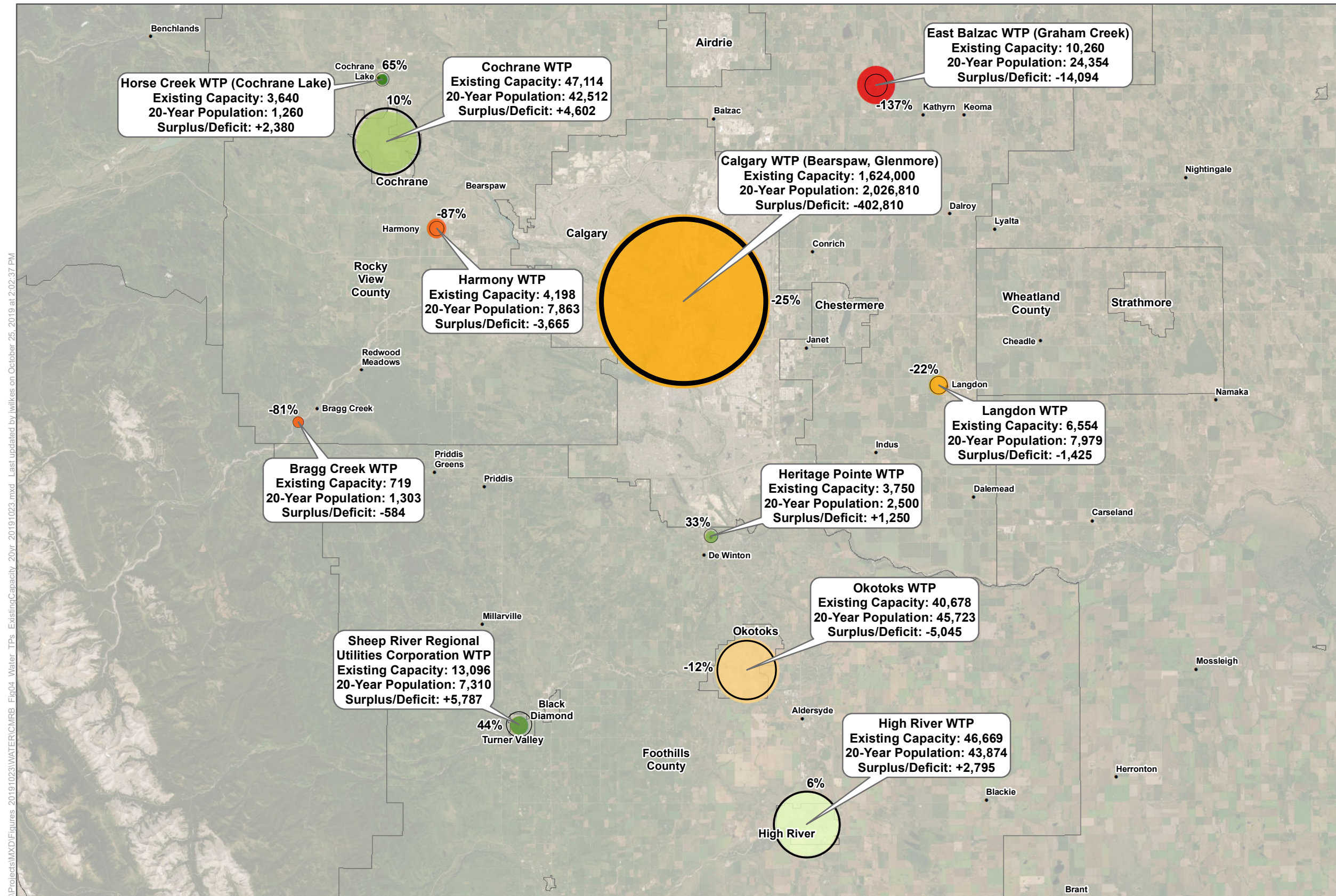
Existing Capacity Comparison: Treatment Infrastructure Existing Capacity vs. 20-Year Population

Legend

- 20-Year Population Equivalent
- Existing Capacity Population Equivalent

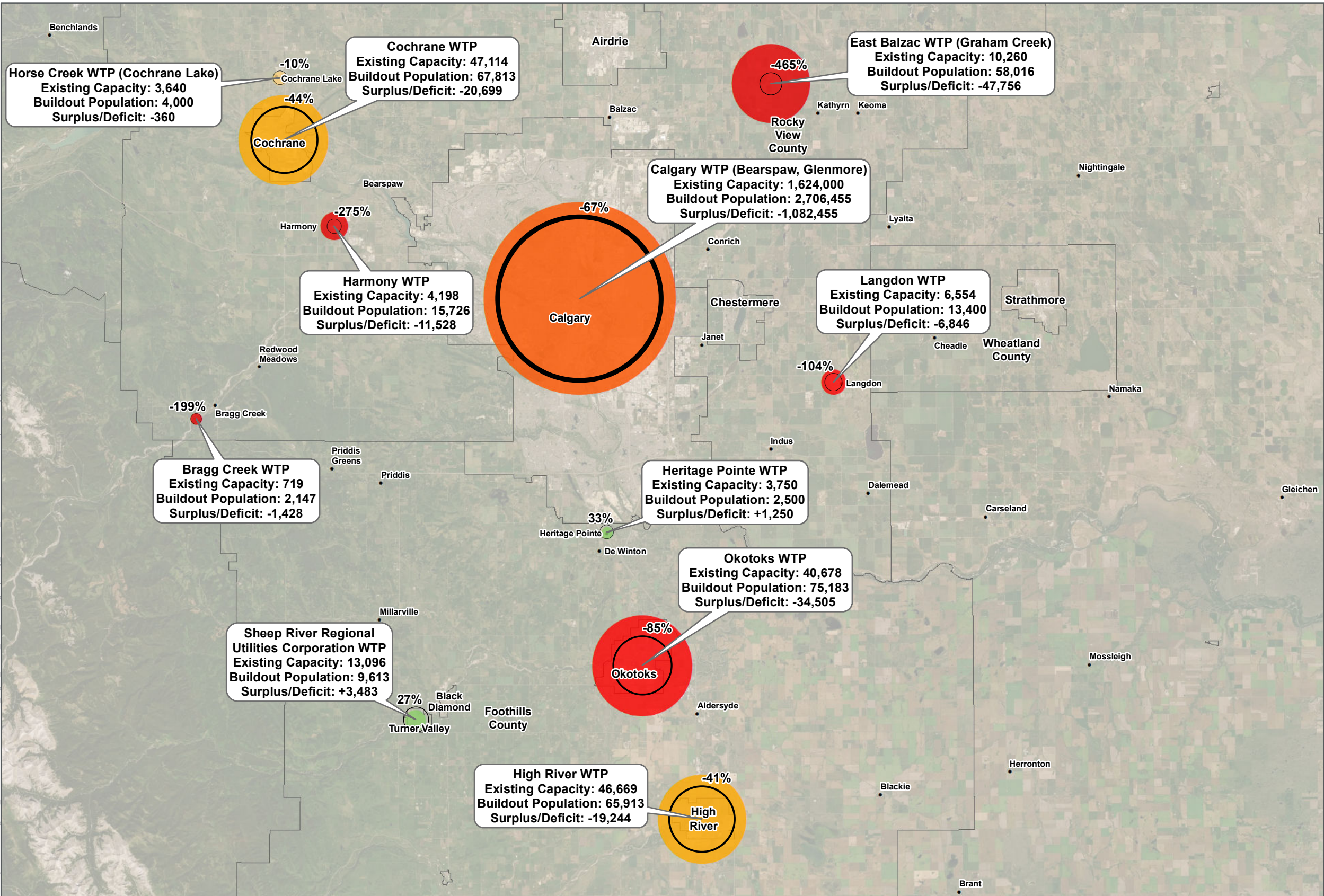
Surplus/Deficit as Percentage of Treatment Capacity

- 100% (Surplus)
- 0% (Meets Demands)
- 0% (Meets Demands)
- 100% (Deficit)



Water Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent	Water License Population Equivalent
Calgary WTP (Bears paw, Glenmore)	1,470,043	2,026,810	2,706,455	1,624,000	3,309,538
Bragg Creek WTP	459	1,303	2,147	719	3,375
Harmony WTP	254	7,863	15,726	4,198	10,705
Langdon WTP	5,370	7,979	13,400	6,554	7,763
East Balzac WTP (Graham Creek)	2,343	24,354	58,016	10,260	14,402
Horse Creek WTP (Cochrane Lakes)	769	1,260	4,000	3,640	10,088
Cochrane WTP	29,277	42,512	67,813	47,114	42,933
Heritage Pointe WTP	2,075	2,500	2,500	3,750	Unknown
SRRUC WTP	4,990	7,310	9,613	13,096	12,997
Okotoks WTP	29,798	45,723	75,183	40,678	31,545
High River WTP	31,689	43,874	65,913	46,669	43,926

U:\Projects_CAL\46260002\011D_Design\GIS\Projects\MXD\Figures 2019\1023\WATER\MRB_Fig05_Water_TPs_ExistingCapacity_Buildout_2019\1023.mxd Last updated by:lwikes on October 25, 2019 at 2:04:40 PM



**Calgary Metropolitan Region
Existing Water and Wastewater
Servicing and Regional Potential**

WATER TREATMENT

**Existing Capacity Comparison:
Treatment Infrastructure
Existing Capacity vs.
2076/Buildout Population**

Legend

- 2076/Buildout Population Equivalent
- Existing Capacity Population Equivalent

Surplus/Deficit as Percentage of Treatment Capacity

- 100% (Surplus)
- 0% (Meets Demands)
- 100% (Deficit)

Water Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent	Water License Population Equivalent
Calgary WTP (Bears paw, Glenmore)	1,470,043	2,026,810	2,706,455	1,624,000	3,309,538
Bragg Creek WTP	459	1,303	2,147	719	3,375
Harmony WTP	254	7,863	15,726	4,198	10,705
Langdon WTP	5,370	7,979	13,400	6,554	7,763
East Balzac WTP (Graham Creek)	2,343	24,354	58,016	10,260	14,402
Horse Creek WTP (Cochrane Lakes)	769	1,260	4,000	3,640	10,088
Cochrane WTP	29,277	42,512	67,813	47,114	42,933
Heritage Pointe WTP	2,075	2,500	2,500	3,750	Unknown
SRRUC WTP	4,990	7,310	9,613	13,096	12,997
Okotoks WTP	29,798	45,723	75,183	40,678	31,545
High River WTP	31,689	43,874	65,913	46,669	43,926



Scale: 1:400000
Figure 5

[This page has intentionally left blank]

4.3 Water Licence

For the water licence analysis, only existing licences are shown, and were provided by the CMR members. Potential licence transfers were not included. The only water treatment plant not included in this analysis is Heritage Pointe as no licence information was available, therefore 10 water treatment plants are included in **Figures 6, 7 and 8**.

Water licence information included in this section only includes licenced annual diversion volume, except for the City of Calgary which considers instantaneous withdrawal rates. As mentioned in Section 3.2, the analysis for the licence annual diversion volume capacity did not consider other important factors, such as climate change variability (drought/ flood), raw water security and licence limitations (such as instantaneous withdrawal rates). Further work will be required in order for the CMR members to manage licencing on a regional scale if it is desired. The intent of this map is to provide a starting point to visually represent existing licence annual volume capacity relative to service area projected demands.

Note water licences connected to WTP infrastructure may be held by multiple municipalities receiving service from the infrastructure. For example, the licences listed as connected to the Calgary WTP include Strathmore's licence as it services the Town of Strathmore. Similarly, licences connected to the SRRUC WTP include licences owned by Black Diamond, Turner Valley and Foothills County. Licences connected to the High River WTP include licences owned by High River, Cargill and Foothills County.

Figures 6, 7 and 8 show a pie-chart graphic in the lower right-hand corner. This graphic was adapted for simplicity and indicates that the licence volumes shown on the figures represent only a fraction of the 13.42% of the total licences allocated for municipal use from the South Saskatchewan River Basin (Alberta Environment, 2003).

Refer to **Section 5** for a summary discussion of the findings.

4.3.1 Annual Water Licence vs. Existing Population

Figure 6 compares the existing annual licence diversion volume (converted to EP) to the 2019 service area population equivalent. The City of Calgary dashed line represents the licence instantaneous withdrawal rate capacity, represented as a population equivalent.

4.3.2 Annual Water Licence vs. 20-Year Population

Figure 7 compares the existing annual licence diversion volume (converted to EP) to the 20-year service area population equivalent. The City of Calgary dashed line represents the licence instantaneous withdrawal rate capacity, represented as a population equivalent.

4.3.3 Annual Water Licence vs. 2076/Buildout Population

Figure 8 compares the existing annual licence diversion volume (converted to EP) to the 2076/buildout service area population equivalent. The City of Calgary dashed line represents the licence instantaneous withdrawal rate capacity, represented as a population equivalent.

[This page has intentionally left blank]

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

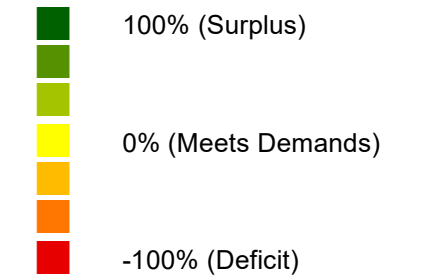
WATER TREATMENT

Water Licence Comparison: Treatment Infrastructure Annual Water Licence vs. Existing Population

Legend

- Existing Population Equivalent
- Annual Water Licence Volume Population Equivalent

Surplus/Deficit as Percentage of Licence Annual Diversion Volume

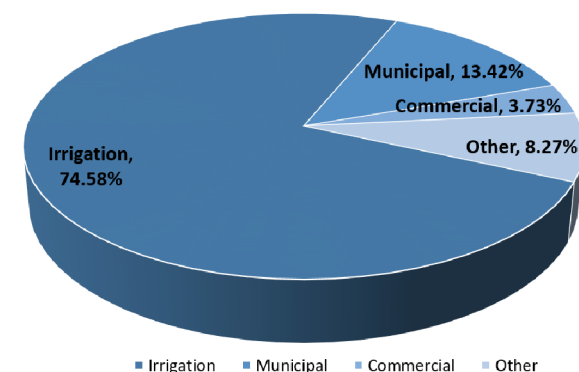


IMPORTANT

Except for Calgary which represents a comparison of the licence instantaneous withdrawal rate the other comparisons represent the licence annual diversion volume only. The ability to divert water may be limited by instantaneous diversion rate, climate variability, in-stream river objectives, seasonal variability of river levels, infrastructure capacity and licence regulatory requirements which are not evaluated within the scope of this study.

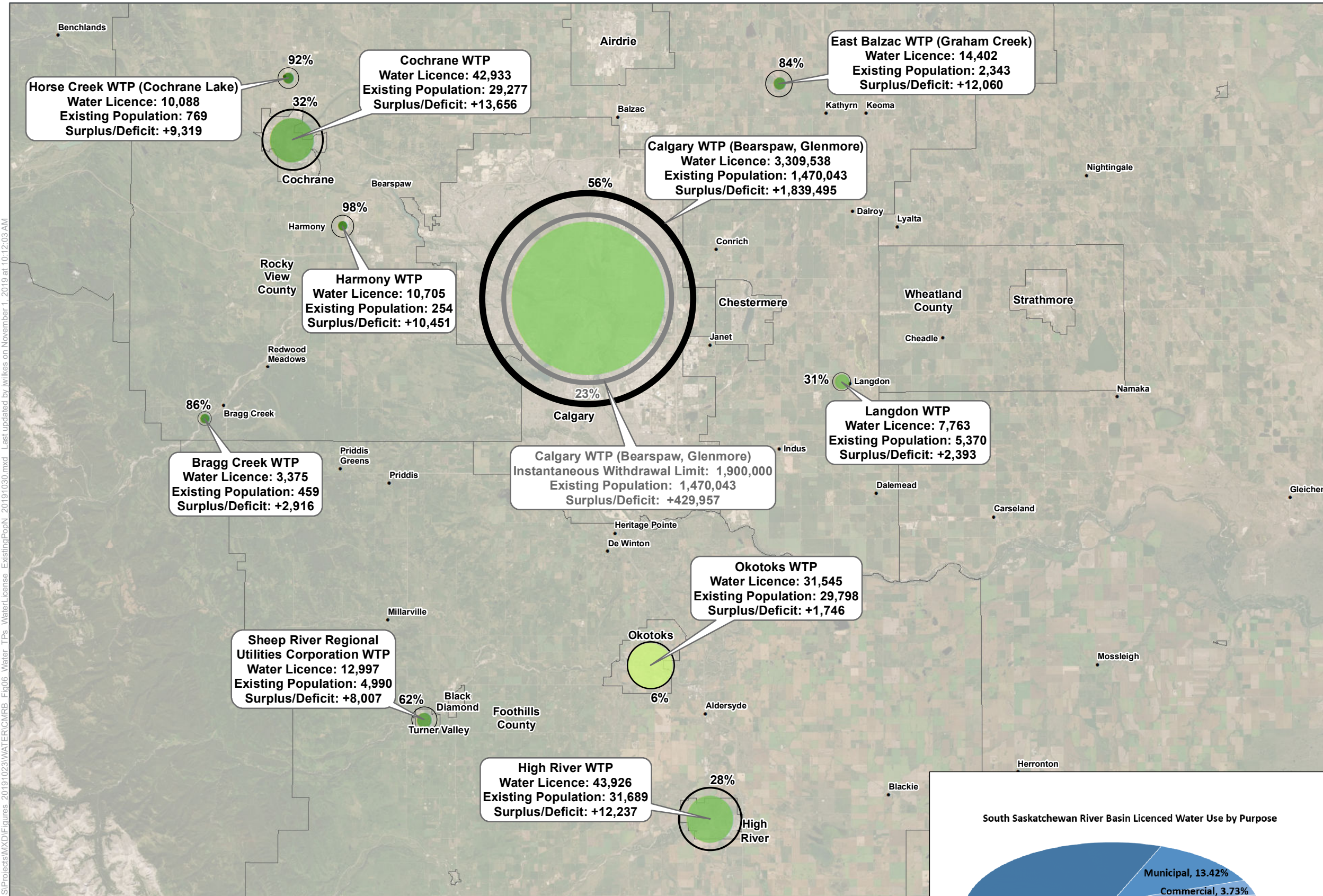
The licences shown on this figure represent only a portion of the 13.42% of the total licences allocated from the South Saskatchewan River Basin.

South Saskatchewan River Basin Licenced Water Use by Purpose



Adapted for simplicity from the South Saskatchewan River Basin Water Allocation Report (Figure 3), Alberta Environment, May 2003.

U:\Projects_CAL\4626\0002\011D_Design\GIS\Projects\MXD\Figures 2019\1023\WATER\MRB_Fig06_Water_TPs_WaterLicence_ExistingPopN_2019\1030.mxd Last updated by jmlikes on November 1, 2019 at 10:12:03 AM



Water Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent	Water Licence Population Equivalent
Calgary WTP (Bears paw, Glenmore)	1,470,043	2,026,810	2,706,455	1,624,000	3,309,538
Bragg Creek WTP	459	1,303	2,147	719	3,375
Harmony WTP	254	7,863	15,726	4,198	10,705
Langdon WTP	5,370	7,979	13,400	6,554	7,763
East Balzac WTP (Graham Creek)	2,343	24,354	58,016	10,260	14,402
Horse Creek WTP (Cochrane Lakes)	769	1,260	4,000	3,640	10,088
Cochrane WTP	29,277	42,512	67,813	47,114	42,933
Heritage Pointe WTP	2,075	2,500	3,750	Unknown	Unknown
SRRUC WTP	4,990	7,310	9,613	13,096	12,997
Okotoks WTP	29,798	45,723	75,183	40,678	31,545
High River WTP	31,689	43,874	65,913	46,669	43,926

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WATER TREATMENT

Water Licence Comparison: Treatment Infrastructure Annual Water Licence vs. 20-Year Population

Legend

20-Year Population Equivalent

Annual Water Licence Volume
Population Equivalent

Surplus/Deficit as Percentage of Licence Annual Diversion Volume

100% (Surplus)

0% (Meets Demands)

0% (Meets Demands)

-100% (Deficit)

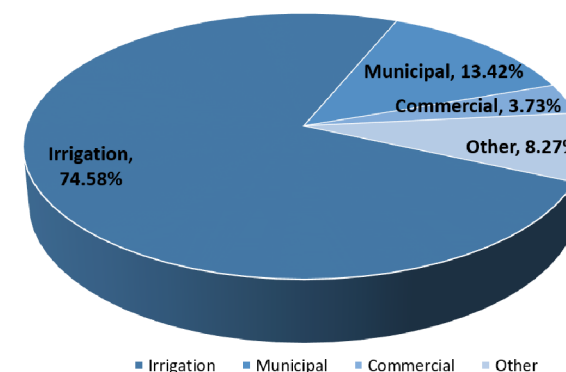
-100% (Deficit)

IMPORTANT

Except for Calgary which represents a comparison of the licence instantaneous withdrawal rate the other comparisons represent the licence annual diversion volume only. The ability to divert water may be limited by instantaneous diversion rate, climate variability, in-stream river objectives, seasonal variability of river levels, infrastructure capacity and licence regulatory requirements which are not evaluated within the scope of this study.

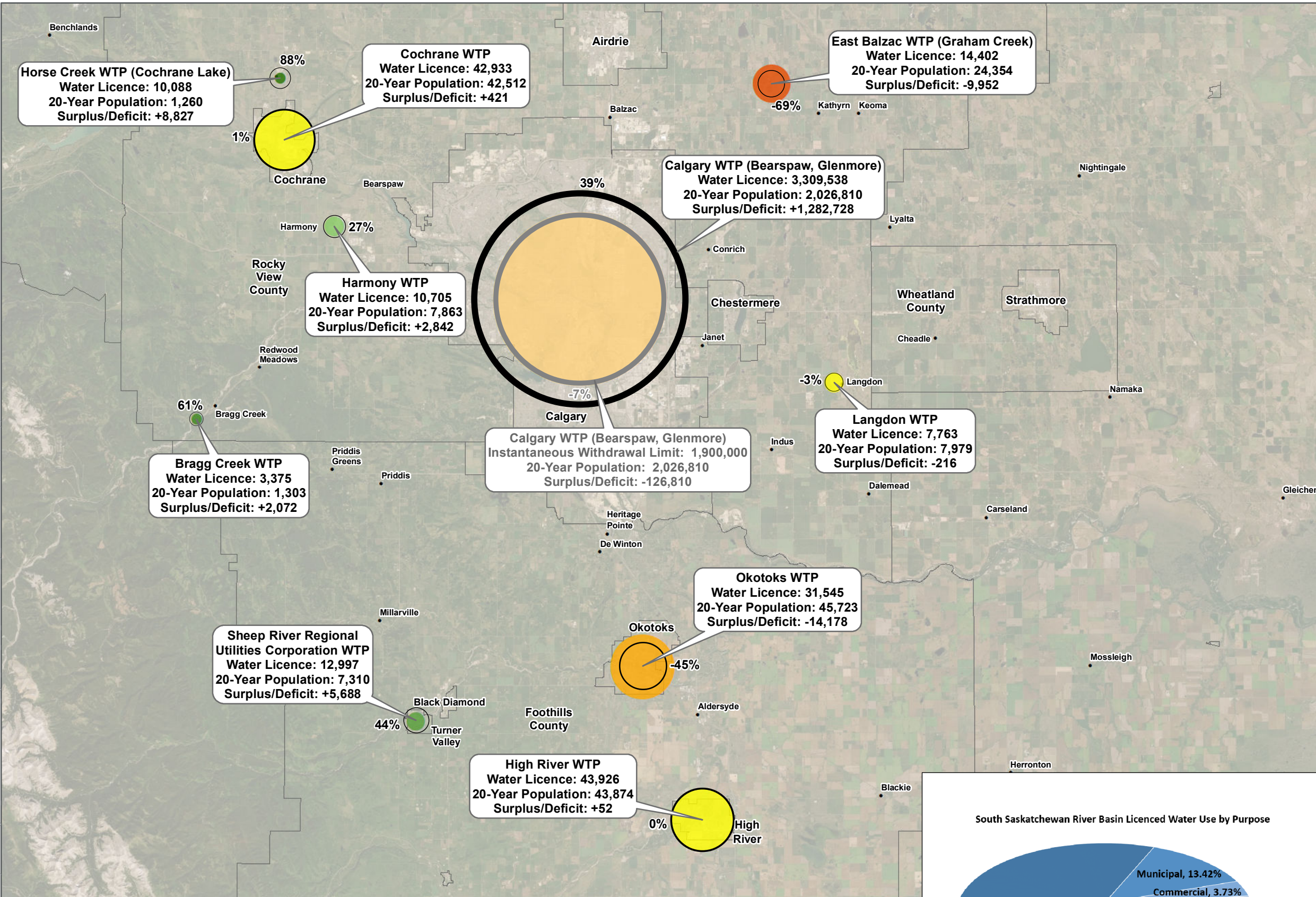
The licences shown on this figure represent only a portion of the 13.42% of the total licences allocated from the South Saskatchewan River Basin.

South Saskatchewan River Basin Licenced Water Use by Purpose



Adapted for simplicity from the South Saskatchewan River Basin Water Allocation Report (Figure 3), Alberta Environment, May 2003.

U:\Projects_CAL\4626\002\011D_Design\GIS\Projects\WATER\MXD\Figures 2019\1023\WATER\MRB_Fig07_Water_TPs_WaterLicence 20yr_20191030.mxd Last updated by jwilkes on November 1, 2019 at 10:13:20 AM



Water Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent	Water Licence Population Equivalent
Calgary WTP (Bears paw, Glenmore)	1,470,043	2,026,810	2,706,455	1,624,000	3,309,538
Bragg Creek WTP	459	1,303	2,147	719	3,375
Harmony WTP	254	7,863	15,726	4,198	10,705
Langdon WTP	5,370	7,979	13,400	6,554	7,763
East Balzac WTP (Graham Creek)	2,343	24,354	58,016	10,260	14,402
Horse Creek WTP (Cochrane Lakes)	769	1,260	4,000	3,640	10,088
Cochrane WTP	29,277	42,512	67,813	47,114	42,933
Heritage Pointe WTP	2,075	2,500	2,500	3,750	Unknown
SRRUC WTP	4,990	7,310	9,613	13,096	12,997
Okotoks WTP	29,798	45,723	75,183	40,678	31,545
High River WTP	31,689	43,874	65,913	46,669	43,926

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WATER TREATMENT

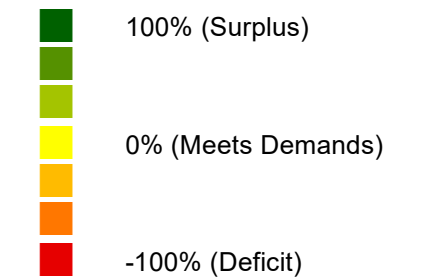
Water Licence Comparison: Treatment Infrastructure Annual Water Licence vs. 2076/Buildout Population

Legend

2076/Buildout Population Equivalent

Annual Water Licence Volume
Population Equivalent

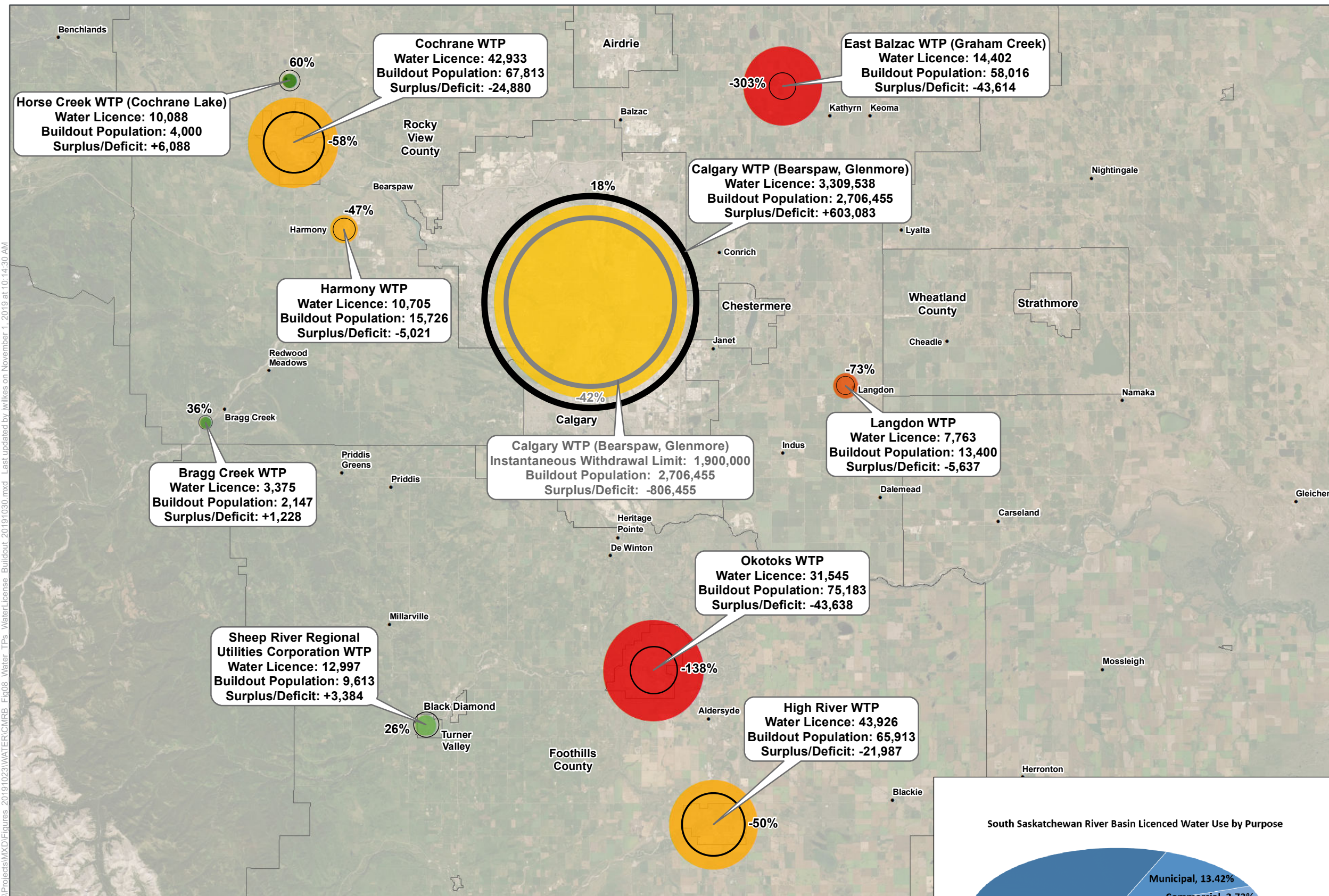
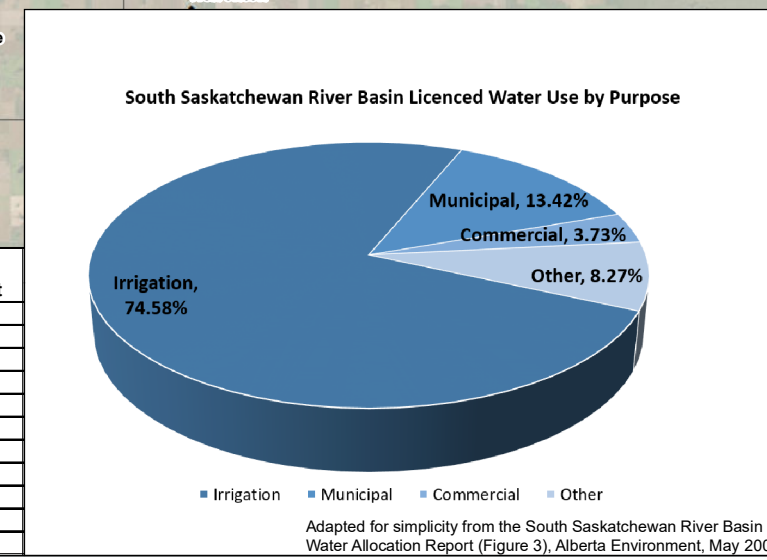
Surplus/Deficit as Percentage of Licence Annual Diversion Volume



IMPORTANT

Except for Calgary which represents a comparison of the licence instantaneous withdrawal rate the other comparisons represent the licence annual diversion volume only. The ability to divert water may be limited by instantaneous diversion rate, climate variability, in-stream river objectives, seasonal variability of river levels, infrastructure capacity and licence regulatory requirements which are not evaluated within the scope of this study.

The licences shown on this figure represent only a portion of the 13.42% of the total licences allocated from the South Saskatchewan River Basin.



Water Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent	Water Licence Population Equivalent
Calgary WTP (Bears paw, Glenmore)	1,470,043	2,026,810	2,706,455	1,624,000	3,309,538
Bragg Creek WTP	459	1,303	2,147	719	3,375
Harmony WTP	254	7,863	15,726	4,198	10,705
Langdon WTP	5,370	7,979	13,400	6,554	7,763
East Balzac WTP (Graham Creek)	2,343	24,354	58,016	10,260	14,402
Horse Creek WTP (Cochrane Lakes)	769	1,260	4,000	3,640	10,088
Cochrane WTP	29,277	42,512	67,813	47,114	42,933
Heritage Pointe WTP	2,075	2,500	3,750	Unknown	Unknown
SRRUC WTP	4,990	7,310	9,613	13,096	12,997
Okotoks WTP	29,798	45,723	75,183	40,678	31,545
High River WTP	31,689	43,874	65,913	46,669	43,926

U:\Projects_CAL\46260002\011D-Design\GIS\Projects\MXD\Figures 2019\1023\WATER\CMBR_Fig08_Water_TPs_WaterLicence_Buildout_2019\1030.mxd Last updated by livlukes on November 1, 2019 at 10:14:30 AM

[This page has intentionally left blank]

4.4 Water Corridors

A total of 10 water corridors were included in this analysis. The corridors represent the total capacity of the water transmission mains which have been identified in Section 3.4.

This study does not review the internal capacity of any of the CMR members distribution systems. Understanding capacity of regional water corridors from one municipality to another requires an understanding of the capacity of the water provider's infrastructure that connects water treatment facilities to regional lines. This is not within the scope of this study, so though a regional line may have hydraulic capacity, it cannot be assumed from this report whether the provider has capacity to connect to the regional line beyond the current agreement.

4.4.1 Existing Capacity vs. Existing Population

Figure 9 compares 2019 service area population equivalent against existing water corridor infrastructure capacity, converted to population equivalents.

4.4.2 Existing Capacity vs. 20-Year Population

Figure 10 compares 20-year service area population equivalent projection against existing water corridor infrastructure capacity, converted to population equivalents.

4.4.3 Existing Capacity vs. 2076/Buildout Population

Figure 11 compares 2076/buildout service area population equivalent projection against existing water corridor infrastructure capacity, converted to population equivalents.

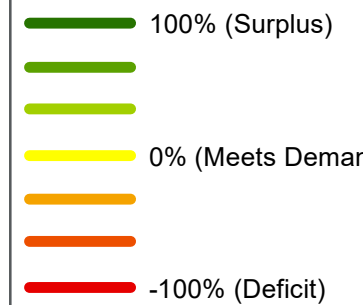
[This page has intentionally left blank]

WATER CORRIDORS

Existing Capacity Comparison:
Corridor Infrastructure
Existing Capacity vs.
Existing Population

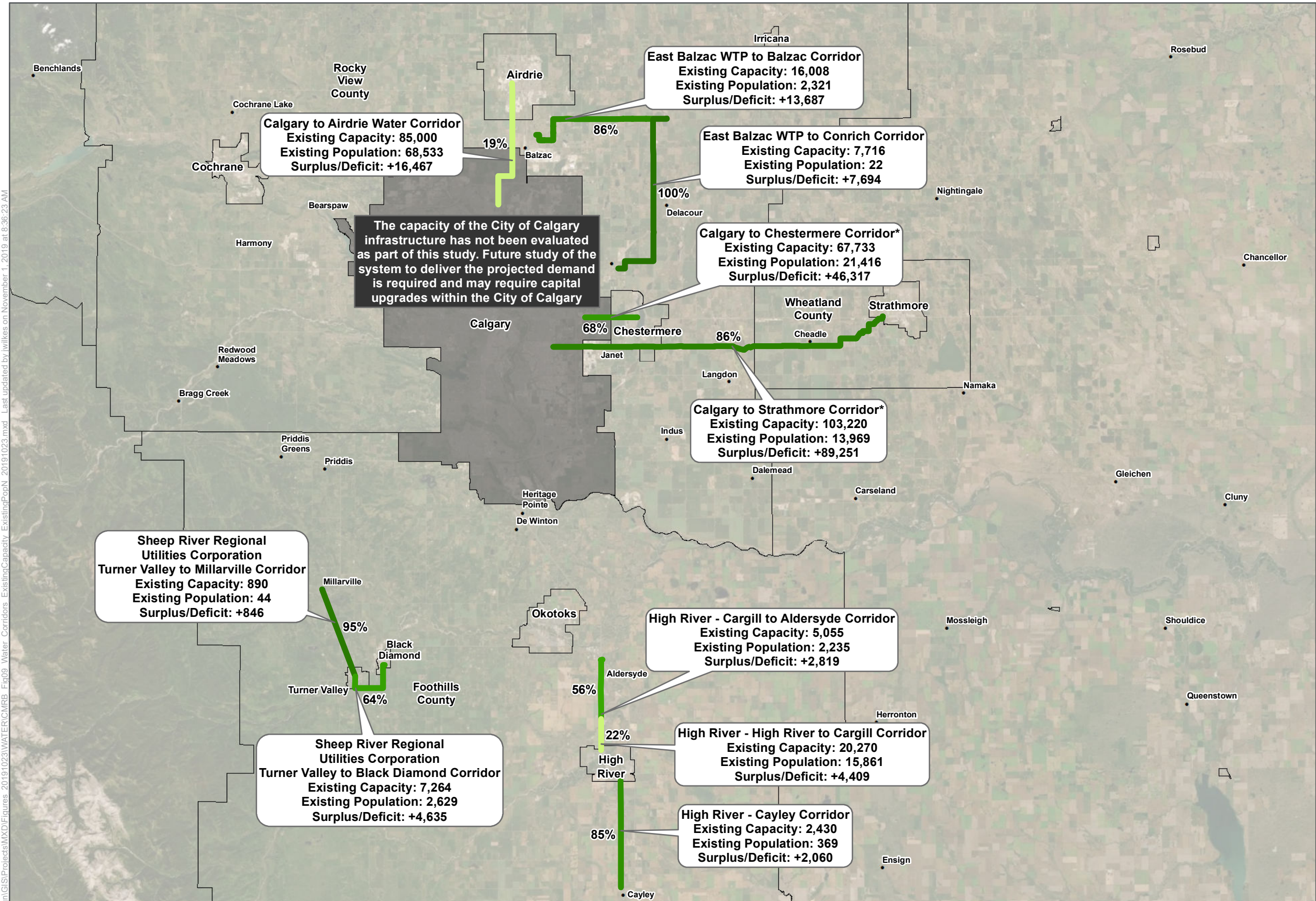
Legend

Surplus/Deficit as Percentage
of Corridor Capacity
Population Equivalent



* The water corridor from Calgary to Chestermere & Strathmore has been shown schematically as two corridors in order to reflect the allocations of capacity for each municipality as compared to each of their service areas.

The capacity of the City of Calgary infrastructure has not been evaluated as part of this study. Future study of the system to deliver the projected demand is required and may require capital upgrades within the City of Calgary



Water Corridor	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Calgary to Airdrie Water Corridor	68,533	110,761	171,931	85,000
Calgary to Chestermere Corridor	21,416	40,582	67,766	67,733
Calgary to Strathmore Corridor	13,969	22,787	39,101	103,220
East Balzac WTP to Balzac Corridor	2,321	18,630	46,589	16,008
East Balzac WTP to Conrich Corridor	22	5,724	11,427	7,716
SRRUC - Turner Valley to Black Diamond Corridor	2,629	3,028	3,427	7,264
SRRUC - Turner Valley to Millarville Corridor	44	60	60	890
High River - High River to Cargill Corridor	15,861	19,940	27,487	20,270
High River - Cargill to Aldersyde Corridor	2,235	6,314	13,861	5,055
High River - Cayley Corridor	369	642	642	2,430

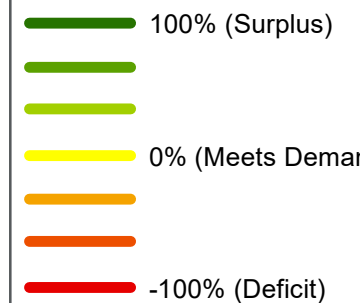
J:\Projects_CAL\4626\002\011D_Design\GIS\Projects\MXD\Figures_2019\1023\WATER\MRB_Fig09_Water_Corridors_ExistingCapacity_ExistingPopN_2019\1023.mxd Last updated by lwilkes on November 1, 2019 at 8:36:23 AM

WATER CORRIDORS

**Existing Capacity Comparison:
Corridor Infrastructure
Existing Capacity vs.
20-Year Population**

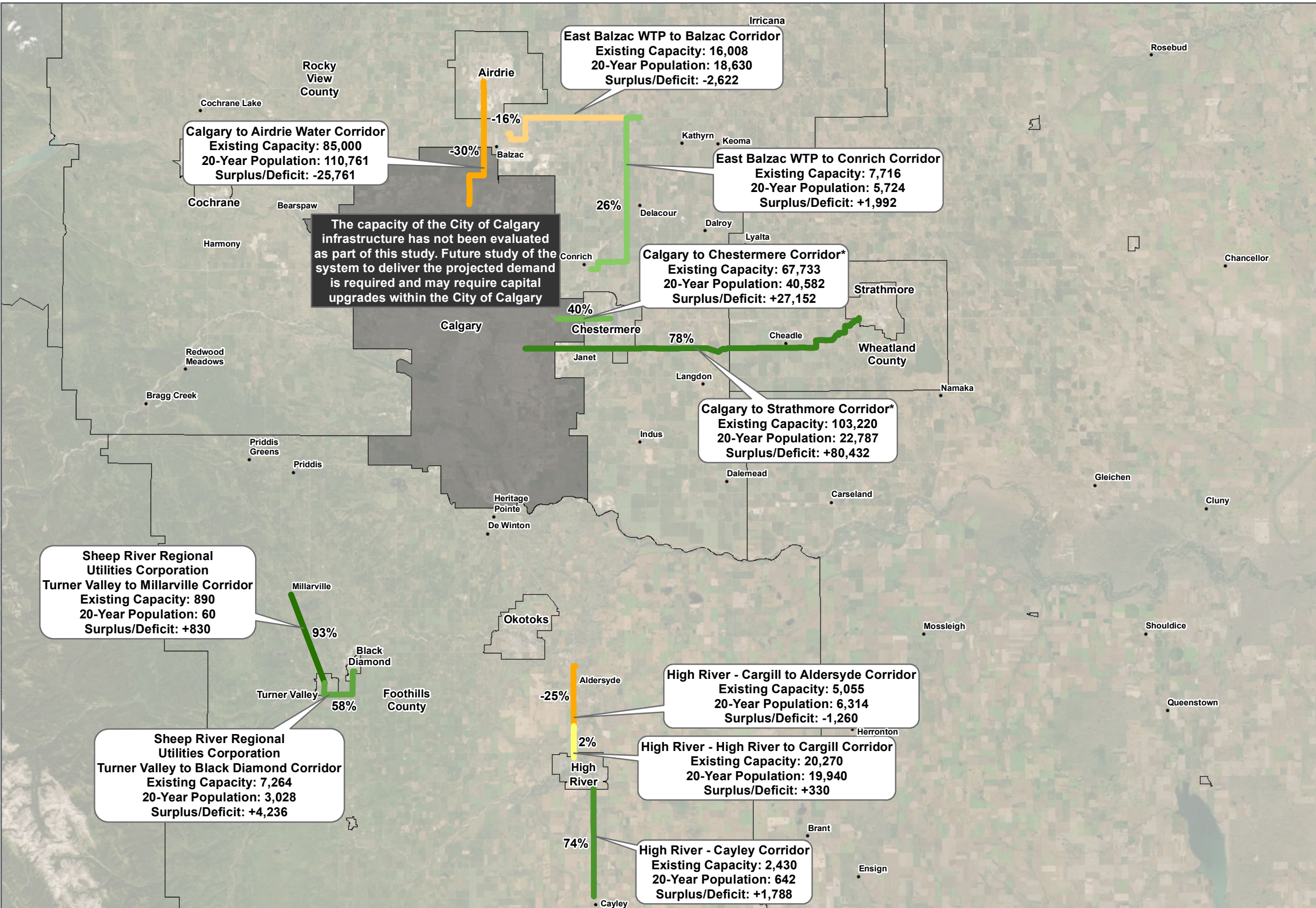
Legend

Surplus/Deficit as Percentage
of Corridor Capacity
Population Equivalent



* The water corridor from Calgary to Chestermere & Strathmore has been shown schematically as two corridors in order to reflect the allocations of capacity for each municipality as compared to each of their service areas.

The capacity of the City of Calgary infrastructure has not been evaluated as part of this study. Future study of the system to deliver the projected demand is required and may require capital upgrades within the City of Calgary



Water Corridor	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Calgary to Airdrie Water Corridor	68,533	110,761	171,931	85,000
Calgary to Chestermere Corridor	21,416	40,582	67,766	67,733
Calgary to Strathmore Corridor	13,969	22,787	39,101	103,220
East Balzac WTP to Balzac Corridor	2,321	18,630	46,589	16,008
East Balzac WTP to Conrich Corridor	22	5,724	11,427	7,716
SRRUC - Turner Valley to Black Diamond Corridor	2,629	3,028	3,427	7,264
SRRUC - Turner Valley to Millarville Corridor	44	60	890	890
High River - High River to Cargill Corridor	15,861	19,940	27,487	20,270
High River - Cargill to Aldersyde Corridor	2,235	6,314	13,861	5,055
High River - Cayley Corridor	369	642	642	2,430

U:\Projects - CAL\4626\002\011D-Design\GIS\Projects\MXD\Figures 2019\1023\WATER\MRB_Fig10_Water_Corridors_ExistingCapacity_20yr_2019\1023.mxd Last updated by jwilkes on November 1, 2019 at 8:37:32 AM

U:\Projects - CAL\4626\002\2011\ID - Design\GIS\Projects\MXD\Figures 2019\1023\WATER\CORRIDORS - Buildout - 2019\1023.mxd - Last updated by jwilkes on November 1, 2019 at 8:39:41 AM



**Calgary Metropolitan Region
 Existing Water and Wastewater
 Servicing and Regional Potential**

WATER CORRIDORS

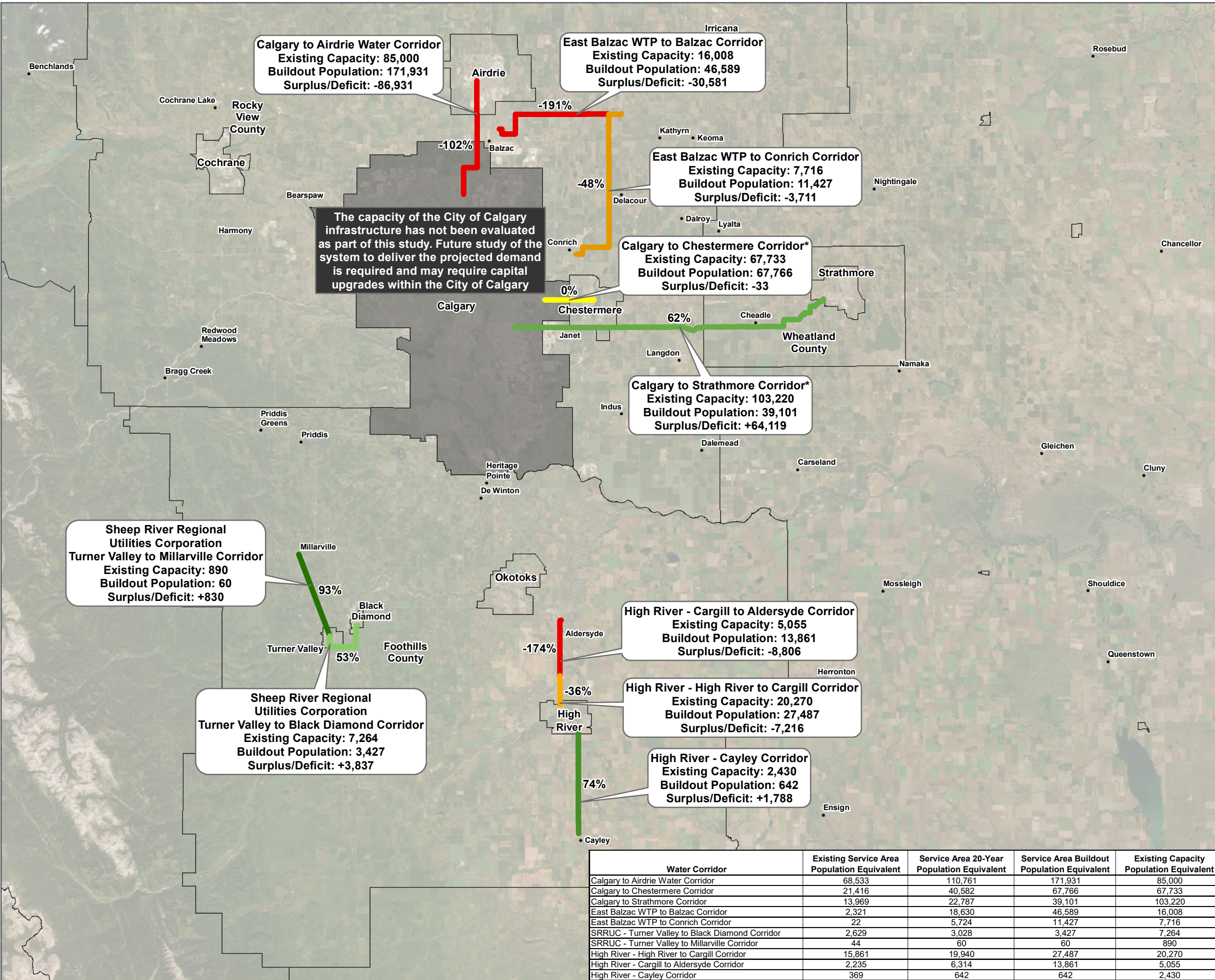
**Existing Capacity Comparison:
 Corridor Infrastructure
 Existing Capacity vs.
 2076/Buildout Population**

Legend

Surplus/Deficit as Percentage of Corridor Capacity Population Equivalent

- █ 100% (Surplus)
- █ 0% (Meets Demand)
- █ -100% (Deficit)

* The water corridor from Calgary to Chestermere & Strathmore has been shown schematically as two corridors in order to reflect the allocations of capacity for each municipality as compared to each of their service areas.



Water Corridor	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Calgary to Airdrie Water Corridor	68,533	110,761	171,931	85,000
Calgary to Chestermere Corridor	21,416	40,582	67,766	67,733
Calgary to Strathmore Corridor	13,969	22,787	39,101	103,220
East Balzac WTP to Balzac Corridor	2,321	18,630	46,589	16,008
East Balzac WTP to Conrich Corridor	22	5,724	11,427	7,716
SRRUC - Turner Valley to Black Diamond Corridor	2,629	3,028	3,427	7,264
SRRUC - Turner Valley to Millarville Corridor	44	60	60	890
High River - High River to Cargill Corridor	15,861	19,940	27,487	20,270
High River - Cargill to Aldersyde Corridor	2,235	6,314	13,861	5,055
High River - Cayley Corridor	369	642	642	2,430

[This page has intentionally left blank]

4.5 Wastewater Treatment

A total of 9 wastewater treatment plants (WWTPs) were included in this analysis. Please note that the City of Calgary WWTPs are represented as two treatment plants (north and south catchments), as the catchments and their contributing service areas were delineated in the information provided.

4.5.1 Existing Capacity vs. Existing Population

Figure 12 compares the existing (2019) service area population equivalents against existing wastewater treatment infrastructure capacity, converted to equivalent population.

4.5.2 Existing Capacity vs. 20-Year Population

Figure 13 compares the service area 20-year projected population equivalent against the existing wastewater treatment infrastructure capacity population equivalents.

4.5.3 Existing Capacity vs. 2076/Buildout Population

Figure 14 compares the service area 2076/buildout projected population equivalents against the existing wastewater treatment infrastructure capacity population equivalents.

[This page has intentionally left blank]

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WASTEWATER TREATMENT

Existing Capacity Comparison: Treatment Infrastructure Existing Capacity vs. Existing Population

Legend

● Existing Population Equivalent

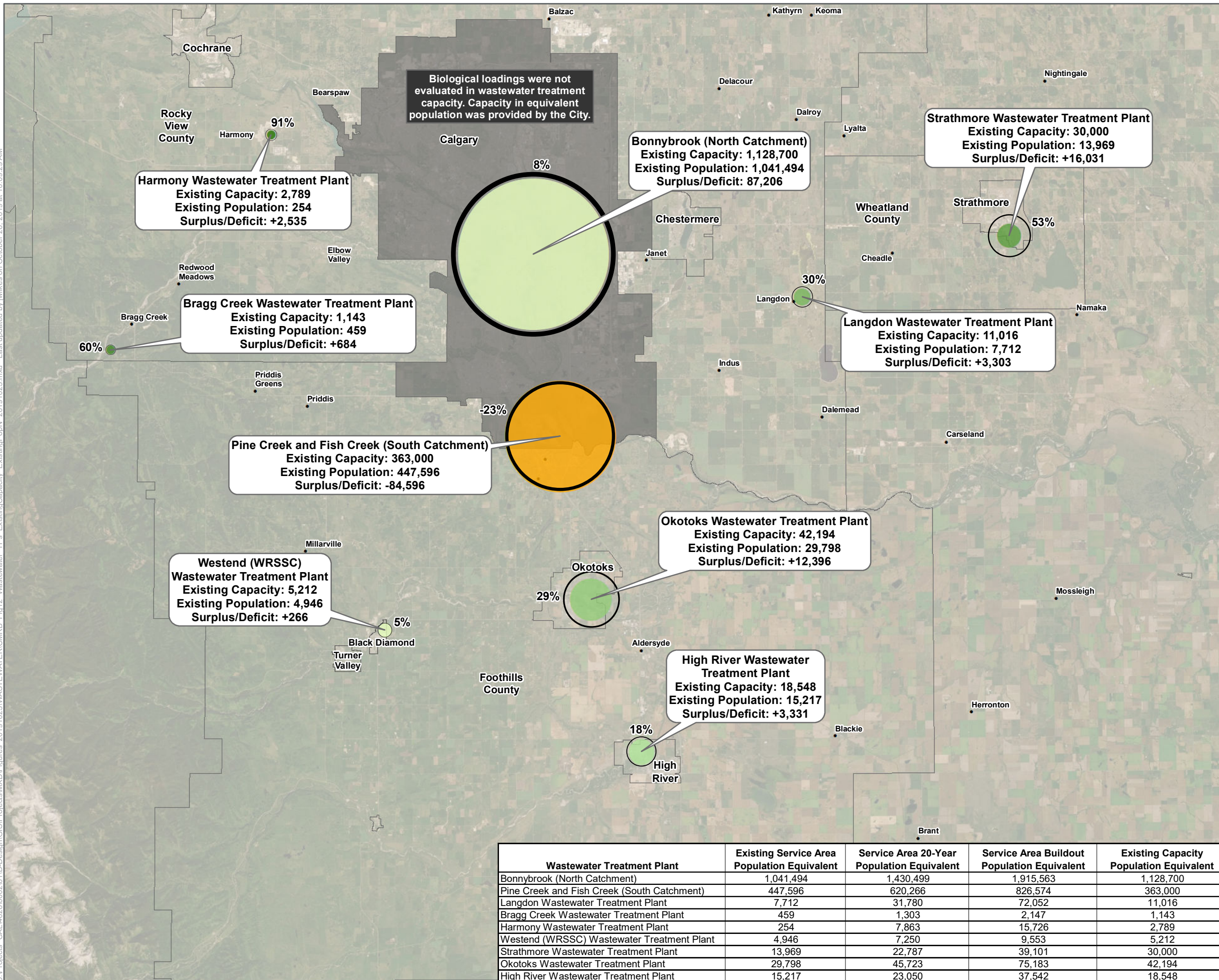
○ Existing Capacity Population Equivalent

Surplus/Deficit as Percentage of Treatment Capacity Population Equivalent

- 100% (Surplus)
-
-
- 0% (Meets Demands)
-
- -100% (Deficit)

Notes: All capacities are expressed as firm capacities.

The City of Calgary is currently serving its local and regional customers by operating their wastewater treatment plants between firm and installed capacity. The City also has some flexibility to transfer wastewater between the two catchments to handle treatment requirements. The City of Calgary also has ongoing WWTP upgrades which are planned to meet the growth requirements of their local and regional customers per the current MSA.



Wastewater Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Bonnybrook (North Catchment)	1,041,494	1,430,499	1,915,563	1,128,700
Pine Creek and Fish Creek (South Catchment)	447,596	620,266	826,574	363,000
Langdon Wastewater Treatment Plant	7,712	31,780	72,052	11,016
Bragg Creek Wastewater Treatment Plant	459	1,303	2,147	1,143
Harmony Wastewater Treatment Plant	254	7,863	15,726	2,789
Westend (WRSSC) Wastewater Treatment Plant	4,946	7,250	9,553	5,212
Strathmore Wastewater Treatment Plant	13,969	22,787	39,101	30,000
Okotoks Wastewater Treatment Plant	29,798	45,723	75,183	42,194
High River Wastewater Treatment Plant	15,217	23,050	37,542	18,548

U:\Projects_CAL\46260002\011D_Design\GIS\Projects\MXD\Figures 20191023\WASTEWATER\CMRB Fig12_Wastewater_TPs_ExistingCapacity_ExistingPopN_20191023.mxd Last updated by lwilkes on October 26, 2019 at 10:09:29 AM

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WASTEWATER TREATMENT

Existing Capacity Comparison: Treatment Infrastructure Existing Capacity vs. 20-Year Population

Legend

● 20-Year Population Equivalent

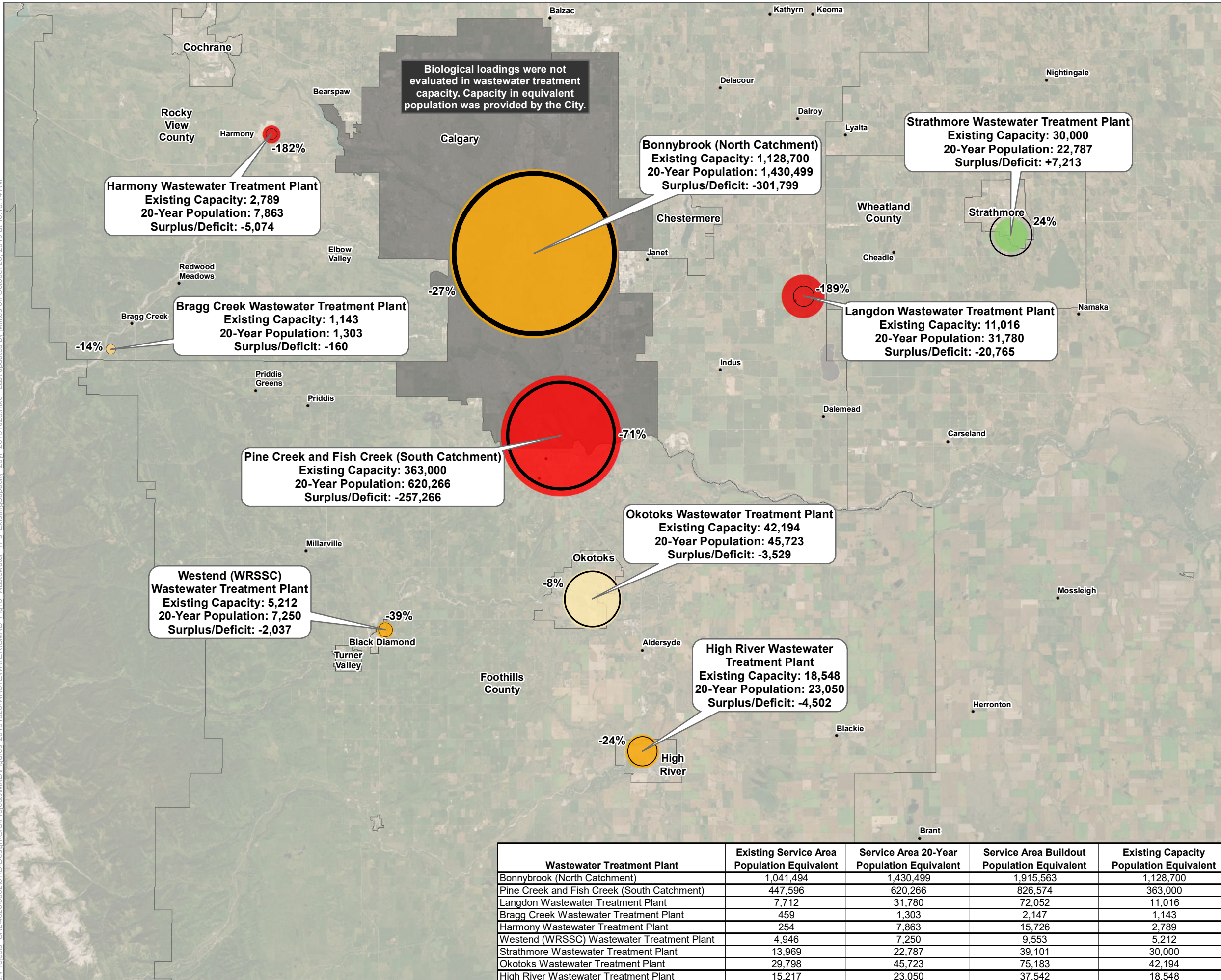
○ Existing Capacity Population Equivalent

Surplus/Deficit as Percentage of Treatment Capacity Population Equivalent

- 100% (Surplus)
-
-
- 0% (Meets Demands)
-
- -100% (Deficit)

Notes: All capacities are expressed as firm capacities.

The City of Calgary is currently serving its local and regional customers by operating their wastewater treatment plants between firm and installed capacity. The City also has some flexibility to transfer wastewater between the two catchments to handle treatment requirements. The City of Calgary also has ongoing WWTP upgrades which are planned to meet the growth requirements of their local and regional customers per the current MSA.



U:\Projects_CAL\46260002\011D_Design\GIS\Projects\WWD\Figures 2019\023\WASTEWATER\CMRB_Fig13_Wastewater_TPs_ExistingCapacity_20yr_2019\023.mxd Last updated by: Wilkes on October 26, 2019 at 10:15:14 AM

Calgary Metropolitan Region Existing Water and Wastewater Servicing and Regional Potential

WASTEWATER TREATMENT

Existing Capacity Comparison: Treatment Infrastructure Existing Capacity vs. 2076/Buildout Population

Legend

● 2076/Buildout Population Equivalent

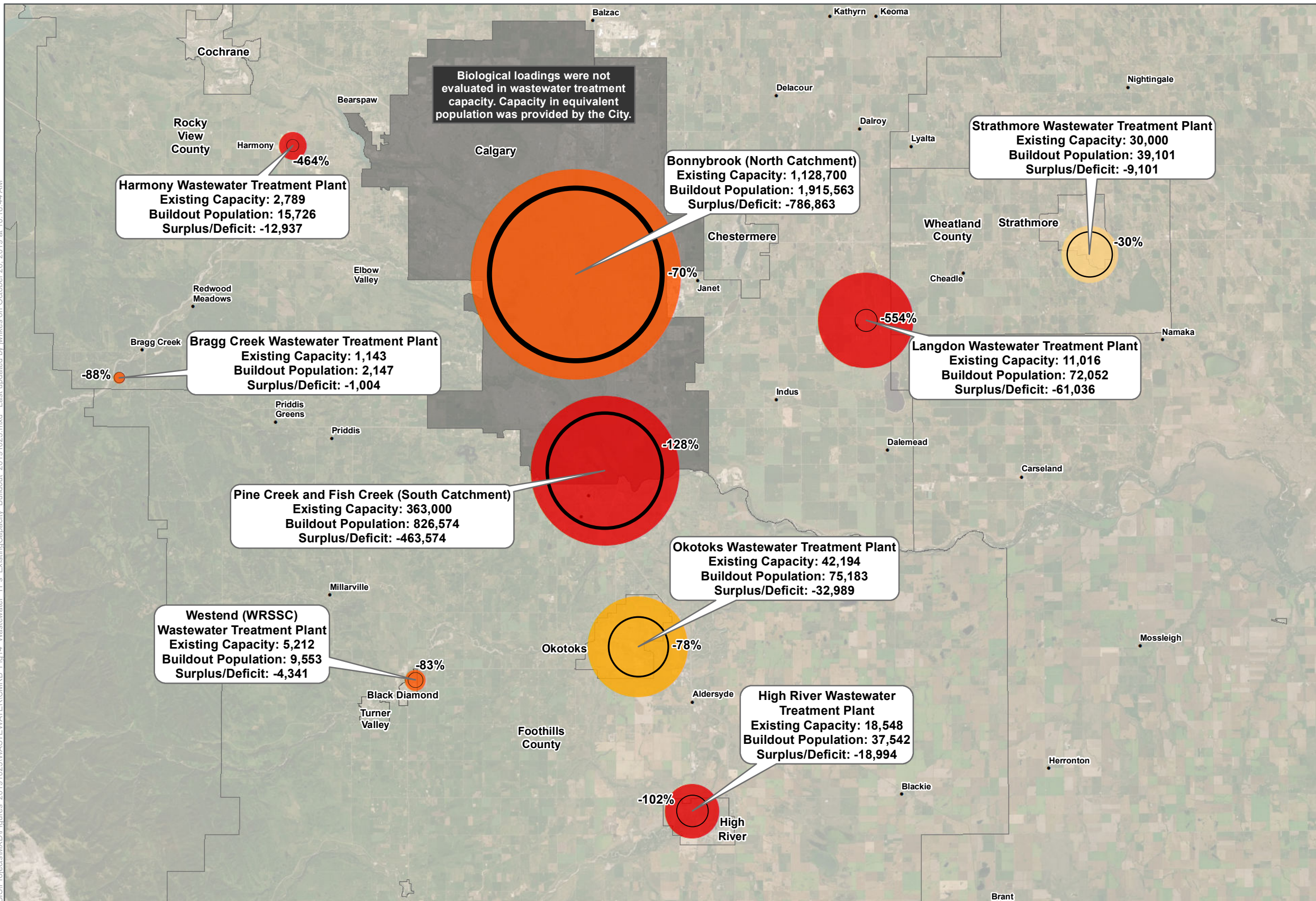
○ Existing Capacity Population Equivalent

Surplus/Deficit as Percentage of Treatment Capacity Population Equivalent

- 100% (Surplus)
- 0% (Meets Demands)
- -100% (Deficit)

Notes: All capacities are expressed as firm capacities.

The City of Calgary is currently servicing its local and regional customers by operating their wastewater treatment plants between firm and installed capacity. The City also has some flexibility to transfer wastewater between the two catchments to handle treatment requirements. The City of Calgary also has ongoing WWTP upgrades which are planned to meet the growth requirements of their local and regional customers per the current MSA.



Wastewater Treatment Plant	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Bonnybrook (North Catchment)	1,041,494	1,430,499	1,915,563	1,128,700
Pine Creek and Fish Creek (South Catchment)	447,596	620,266	826,574	363,000
Langdon Wastewater Treatment Plant	7,712	31,780	72,052	11,016
Bragg Creek Wastewater Treatment Plant	459	1,303	2,147	1,143
Harmony Wastewater Treatment Plant	254	7,863	15,726	2,789
Westend (WRSSC) Wastewater Treatment Plant	4,946	7,250	9,553	5,212
Strathmore Wastewater Treatment Plant	13,969	22,787	39,101	30,000
Okotoks Wastewater Treatment Plant	29,798	45,723	75,183	42,194
High River Wastewater Treatment Plant	15,217	23,050	37,542	18,548

J:\Projects_CAL\4626\002\011D_Design\GIS\Projects\MXD\Figures 20191023\WASTEWATER\MRB Fig14_Wastewater_TPs_ExistingCapacity_Buildout 20191023.mxd Last updated by livilkes on October 26, 2019 at 10:18:44 AM

[This page has intentionally left blank]

4.6 Wastewater Corridors

A total of 7 wastewater corridors are analyzed in this study. The corridors represent the total capacity of the wastewater transmission mains. Existing capacity population equivalents were calculated the same as noted in the above sections.

This study does not review the capacity of any of the CMR members collection or pumping systems, which are required to accommodate the planned growth inside their boundary and servicing contracts with existing regional customers. Understanding capacity of regional wastewater systems requires an understanding of the capacity of each municipality's collection infrastructure that connects collection systems to regional lines, and regional lines to wastewater treatment facilities. This is not within the scope of this study, so though a regional line may have hydraulic capacity, it cannot be assumed from this report whether overall there is capacity to accept the projected flows beyond the current agreements.

4.6.1 Existing Capacity vs. Existing Population

Figure 15 compares the existing (2019) service area population equivalent against the existing wastewater corridor capacity in population equivalents.

4.6.2 Existing Capacity vs. 20-Year Population

Figure 16 compares the 20-year service area population equivalent against the existing wastewater corridor capacity in population equivalents.

4.6.3 Existing Capacity vs. 2076/Buildout Population

Figure 17 compares the 2076/buildout service area population equivalent against the existing wastewater corridor capacity in population equivalents.

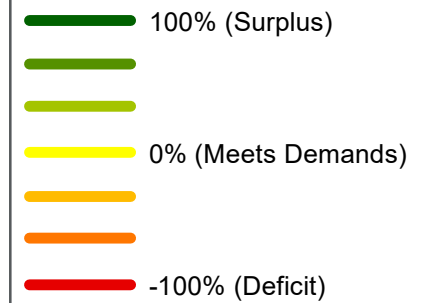
[This page has intentionally left blank]

WASTEWATER CORRIDORS

Existing Capacity Comparison:
Corridor Infrastructure
Existing Capacity vs.
Existing Population

Legend

Surplus/Deficit as Percentage
of Corridor Capacity
Population Equivalent



The capacity of the City of Calgary infrastructure to convey the projected flows within their boundary have not been analyzed in this study. Future analysis is required and capacity capital upgrades may be required to convey the future projected flows to the wastewater treatment plants.

Cochrane Lake to Cochrane Wastewater Corridor
Existing Capacity: 10,368
Existing Population: 769
Surplus/Deficit: +9,599

Airdrie to Calgary Wastewater Corridor
Existing Capacity: 81,057
Existing Population: 68,533
Surplus/Deficit: +12,524

East Rocky View Wastewater Corridor (Balzac to Conrich)
Existing Capacity: 27,693
Existing Population: 2,321
Surplus/Deficit: +25,372

Cochrane to Calgary Wastewater Corridor
Existing Capacity: 31,418
Existing Population: 28,921
Surplus/Deficit: +2,497

Elbow Valley to Calgary Wastewater Corridor
Existing Capacity: 4,005
Existing Population: 2,970
Surplus/Deficit: +1,035

Chestermere to Calgary Wastewater Corridor
Existing Capacity: 52,160
Existing Population: 21,416
Surplus/Deficit: +30,744

East Rocky View Wastewater Corridor (Conrich to Langdon)
Existing Capacity: 38,671
Existing Population: 2,343
Surplus/Deficit: +36,328

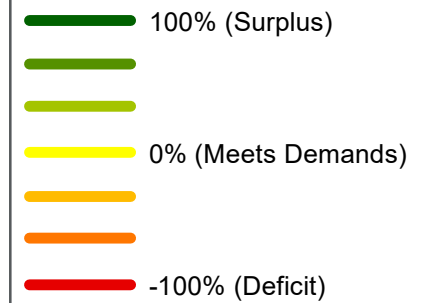
Wastewater Corridor	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Airdrie to Calgary Wastewater Corridor	68,533	110,761	171,931	81,057
Chestermere to Calgary Wastewater Corridor	21,416	40,582	67,766	52,160
Cochrane to Calgary Wastewater Corridor	28,921	43,772	71,813	31,418
Cochrane Lake to Cochrane Wastewater Corridor	769	1,260	4,000	10,368
East Rocky View Wastewater Corridor (Balzac to Conrich)	2,321	18,077	47,225	27,693
East Rocky View Wastewater Corridor (Conrich to Langdon)	2,343	23,801	58,652	38,671
Elbow Valley to Calgary Wastewater Corridor	2,970	2,970	2,970	4,005

WASTEWATER CORRIDORS

Existing Capacity Comparison:
Corridor Infrastructure
Existing Capacity vs.
20-Year Population

Legend

Surplus/Deficit as Percentage
of Corridor Capacity
Population Equivalent



The capacity of the City of Calgary infrastructure to convey the projected flows within their boundary have not been analyzed in this study. Future analysis is required and capacity capital upgrades may be required to convey the future projected flows to the wastewater treatment plants.

Cochrane Lake to Cochrane Wastewater Corridor
Existing Capacity: 10,368
20-Year Population: 1,260
Surplus/Deficit: +9,108

Airdrie to Calgary Wastewater Corridor
Existing Capacity: 81,057
20-Year Population: 110,761
Surplus/Deficit: -29,704

East Rocky View Wastewater Corridor (Balzac to Conrich)
Existing Capacity: 27,693
20-Year Population: 18,077
Surplus/Deficit: +9,617

Cochrane to Calgary Wastewater Corridor
Existing Capacity: 31,418
20-Year Population: 43,772
Surplus/Deficit: -12,354

Chestermere to Calgary Wastewater Corridor
Existing Capacity: 52,160
20-Year Population: 40,582
Surplus/Deficit: +11,578

East Rocky View Wastewater Corridor (Conrich to Langdon)
Existing Capacity: 38,671
20-Year Population: 23,801
Surplus/Deficit: +14,870

Elbow Valley to Calgary Wastewater Corridor
Existing Capacity: 4,005
20-Year Population: 2,970
Surplus/Deficit: +1,035

Wastewater Corridor	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Airdrie to Calgary Wastewater Corridor	68,533	110,761	171,931	81,057
Chestermere to Calgary Wastewater Corridor	21,416	40,582	67,766	52,160
Cochrane to Calgary Wastewater Corridor	28,921	43,772	71,813	31,418
Cochrane Lake to Cochrane Wastewater Corridor	769	1,260	4,000	10,368
East Rocky View Wastewater Corridor (Balzac to Conrich)	2,321	18,077	47,225	27,693
East Rocky View Wastewater Corridor (Conrich to Langdon)	2,343	23,801	58,652	38,671
Elbow Valley to Calgary Wastewater Corridor	2,970	2,970	2,970	4,005

U:\Projects_CAL\46260002\011D_Design\GIS\Projects\MXD\Figures_2019\1023\WASTEWATER\CMRB_Fig16_Wastewater_Corridors_ExistingCapacity_20Yr_20191023.mxd Last updated by lwilkes on October 25, 2019 at 1:55:46 PM

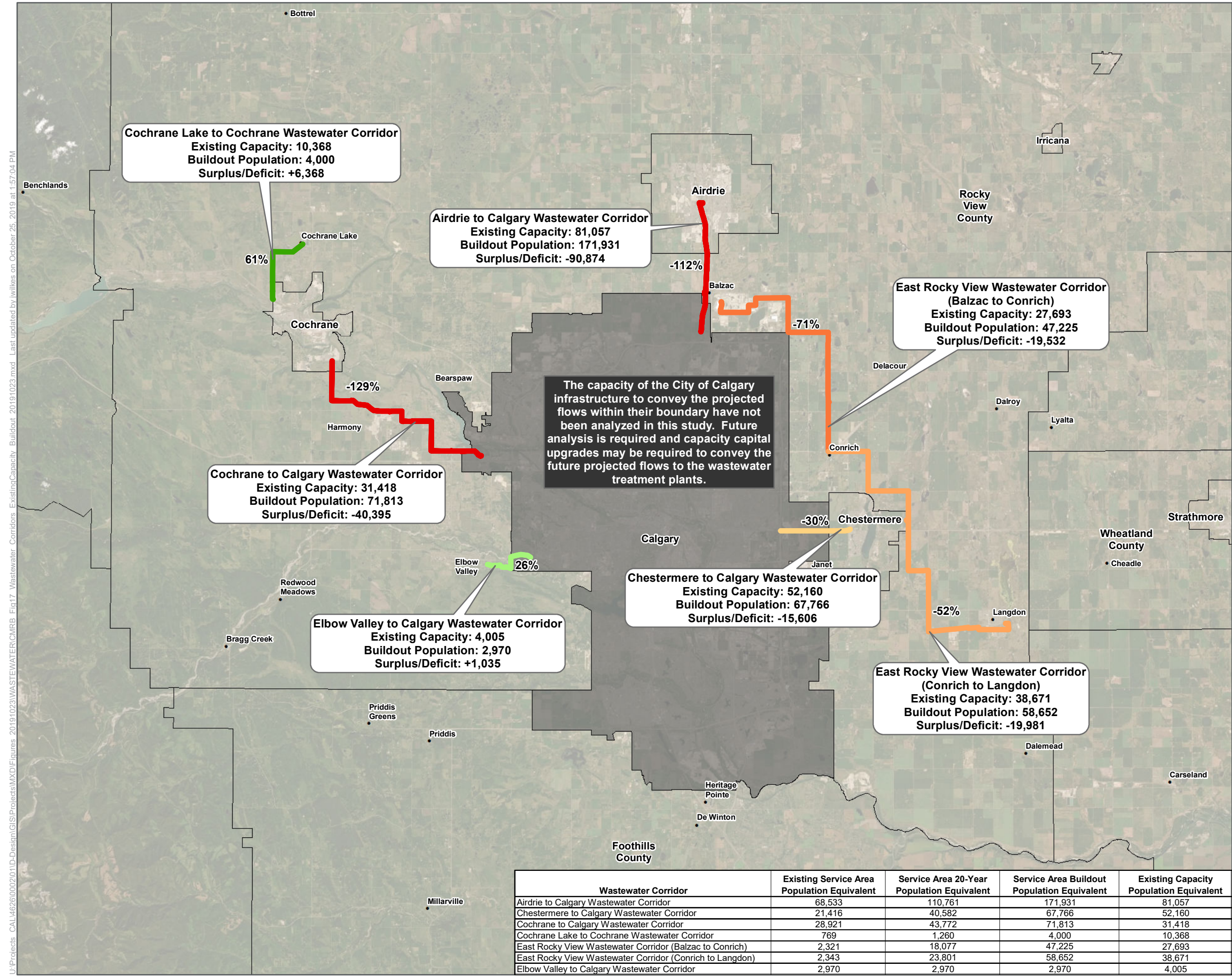
WASTEWATER CORRIDORS

Existing Capacity Comparison:
Corridor Infrastructure
Existing Capacity vs.
2076/Buildout Population

Legend

Surplus/Deficit as Percentage
of Corridor Capacity
Population Equivalent

- █ 100% (Surplus)
- █
- █ 0% (Meets Demands)
- █
- █ -100% (Deficit)



Wastewater Corridor	Existing Service Area Population Equivalent	Service Area 20-Year Population Equivalent	Service Area Buildout Population Equivalent	Existing Capacity Population Equivalent
Airdrie to Calgary Wastewater Corridor	68,533	110,761	171,931	81,057
Chestermere to Calgary Wastewater Corridor	21,416	40,582	67,766	52,160
Cochrane to Calgary Wastewater Corridor	28,921	43,772	71,813	31,418
Cochrane Lake to Cochrane Wastewater Corridor	769	1,260	4,000	10,368
East Rocky View Wastewater Corridor (Balzac to Conrich)	2,321	18,077	47,225	27,693
East Rocky View Wastewater Corridor (Conrich to Langdon)	2,343	23,801	58,652	38,671
Elbow Valley to Calgary Wastewater Corridor	2,970	2,970	2,970	4,005

[This page has intentionally left blank]

5 Summary of Findings

5.1 Water Treatment

Figures 3, 4 and 5 represent the comparison between the existing WTP firm capacity (represented by equivalent population) and their service area demands in the following three timeframes:

- **Existing Capacity vs. Current (2019) Service Area Population:** As expected, the WTPs all have capacity for today's service area population.
- **Existing Capacity vs. 20-Year Service Area Population:** It is not unusual to see deficits when comparing existing WTP capacity against the 20-year service area demands. This is because municipalities do not typically build full treatment capacity 20 years in advance of when it is needed. Most WTP capacity upgrades are phased in over time to provide capacity for 5 to 10 years of growth. This analysis shows the deficit to allow for planning of upgrades within the 20-year timeframe.

This map indicates that only Cochrane, Horse Creek, High River, Heritage Pointe and the SRRUC WTPs will have excess capacity in the 20-year timeframe.

- **Existing Capacity vs. 2076/Buildout Service Area Population:** Similar to the 20-year comparison, a WTP would not be expected to show surplus capacity for a buildout or 60-year timeframe. However, it is useful to see where the deficits grow over time to the 60-year or buildout timeframe.

Worth noting is that the SRRUC WTP shows surplus capacity to serve buildout of the existing Town boundaries. Population projections beyond their boundaries were not provided by the CMRB (Rennie Intelligence, 2018). Further annexation could increase demands of the SRRUC service area.

5.2 Water Licence

Figures 6, 7 and 8 represent the comparison between the existing WTP licence annual diversion volume (represented by equivalent population) and the service area demands in the following three timeframes:

- **Existing Licence Annual Diversion Volume vs. Current (2019) Service Area Population:** This map shows that all municipalities have enough total annual diversion volume currently to support the 2019 service area demands.
- **Existing Licence Annual Diversion Volume vs. 20-Year Service Area Population:** This map indicates that in 20 years, Okotoks, Langdon, and East Balzac WTP will not have sufficient annual licence volume to support the service area demands. Cochrane and High River will be just meeting their population needs at this time.

Calgary's licence instantaneous withdrawal (the grey circle) does not have capacity in this timeframe. The larger outer circle represents Calgary's total annual diversion volume, which has enough capacity for its service area population.

- **Existing Licence Annual Diversion Volume vs. 2076/Buildout Service Area Population:** This map indicates that by 2076/Buildout, Cochrane, Harmony, Okotoks, High River, Langdon, and East Balzac WTP will not have enough annual licence volume to support the service area demands.

Calgary's licence instantaneous withdrawal (the grey circle) does not have capacity in this timeframe. The larger outer circle represents Calgary's total annual diversion volume, which has enough capacity for its service area population.

The analysis indicates a few municipalities with surplus annual volume in their licences. However, this analysis does not review other limitations of the licences such as instantaneous withdrawal rates, which are important to consider further. Having surplus volume on an annual basis also does not ensure that the rivers will have capacity to support unrestricted withdrawal of the volume. More work is therefore needed to understand the physical water supply and evaluate how the region will manage licences with all of their complexities and restrictions over the next 60-year timeframe.

5.3 Water Corridors

Figures 9, 10 and 11 represent the comparison between the existing water corridor design capacities (represented by equivalent population) and their service area population demands in the following three timeframes:

- **Existing Capacity vs. Current (2019) Service Area Population:** As expected, this map shows that currently each water corridor has sufficient capacity to support the existing service area demands.
- **Existing Capacity vs. 20 Year Service Area Population:** In 20 years, the Cargill to Aldersyde and the East Balzac WTP to Balzac corridors will have deficits in capacity. The Airdrie corridor is shown to be in a deficit with regard to system resilience. This is in consideration of a number of factors including capacity, reliability and redundancy with pipe, pumping, and storage. Specifically, the largest pipeline is operated at lower pressure and flow in order to manage the risk of an extended disruption to water supply for the City of Airdrie. Mitigation options explored by the City, in the form of additional reservoir storage was deemed not practical.
- **Existing Capacity vs. 2076/Buildout Service Area Population:** Figure 11 shows that few corridors within the region have remaining capacity in this timeframe. The Calgary to Chestermere corridor is at capacity in this timeframe. The Calgary to Strathmore corridor, the corridor from High River to Cayley and the SRRUC corridors have surplus capacity.

5.4 Wastewater Treatment

Figures 12, 13 and 14 represent the comparison between the existing wastewater treatment plant firm design capacities (represented by equivalent population) and their service area flows in the following three timeframes:

- **Existing Capacity vs. Current (2019) Service Area Population:** Figure 12 indicates all WWTPs are currently meeting the needs of their service areas.

The Calgary Pine Creek and Fish Creek (South Catchment) WWTPs is shown as currently serving over its designed firm treatment capacity. However, the City has flexibility to transfer wastewater between the two catchments to handle treatment requirements and is therefore overall meeting the current needs of the customers.

- **Existing Capacity vs. 20-Year Service Area Population:** All WWTPs shown on this map are shown as having deficits in capacity in the 20-year timeframe except Strathmore WWTP. Similar to the WTPs, this is expected as capital upgrade funding is typically phased over 10-year increments to manage cash flow. It is useful however to understand the magnitude of the flows expected within the 20-year timeframe for regional planning.
- **Existing Capacity vs. 2076/Buildout Service Area Population:** In the long-term scenario, all WWTPs are shown as having capacity deficits, which is expected for this timeframe. This Figure identifies qualitatively the magnitude and variability in wastewater treatment deficits within the region. It is useful to understand the magnitude of flows expected within the 2076/buildout timeframe for regional planning.

5.5 Wastewater Corridors

Figures 15, 16 and 17 represent the comparison between the existing wastewater corridor capacities (represented by equivalent population) and their service area population in the following three timeframes:

- **Existing Capacity vs. Current (2019) Service Area Population:** All corridors are shown as having surplus capacity. The Cochrane to Calgary corridor has only 8% surplus capacity, however the Town is planning a first phase of pipeline twinning in the next few years which will increase its capacity.
- **Existing Capacity vs. 20-Year Service Area Population:** In 20 years, the Cochrane and Airdrie corridors will have capacity deficits. As discussed previously, Cochrane is planning a pipeline twinning in the next few years. However, only constructed infrastructure (not planned) was analyzed in this study.
- **Existing Capacity vs. 2076/Buildout Service Area Population:** In the long term, all corridors have large capacity deficits except the Cochrane Lake to Cochrane and the Elbow Valley to Calgary corridors. If additional service areas would like to connect to these collection systems, these corridors may also have capacity deficits based on already committed MSAs, therefore additional analysis will be required.

6 References

- AECOM. (2012). *Town of Strathmore Master Servicing Study Update Water and Sanitary*. Calgary.
- Alberta Environment. (2003). *South Saskatchewan River Basin Water Allocation Report*.
- AllNorth. (2017). *Town of Strathmore Master Servicing Study – 2017 Update*. Calgary.
- Associated Engineering. (2011). *City of Calgary Water Long Range Plan*. Calgary.
- BSEI. (2011). *Town of High River Alternate Upgrades Study to the Wastewater Treatment Facilities*. Calgary.
- ISL Engineering and Land Services. (2016). *Airdrie Utility Master Plan*. Calgary.
- ISL Engineering and Land Services. (2017). *High River Utility Master Plan*. Calgary.
- Macdonald Communities Ltd. (2019). *Utility Servicing for Cochrane Lake Village*. Calgary.
- MPE Engineering. (2009). *Water Inter-Municipal Partnership Feasibility Study*. Calgary.
- MPE Engineering. (2010). *Highway 2A ASP Water Servicing Report*. Calgary.
- MPE Engineering. (2012). *Balzac Master Potable Water Plan*. Calgary.
- MPE Engineering. (2013). *Rocky View County Conrich Potable Network Plan*. Calgary.
- MPE Engineering. (2015). *Westend Regional Sewage Services Commission Plan for Operating Approval*. Calgary.
- MPE Engineering. (2018). *Rocky View County Water and Wastewater Offsite Levy Update*. Calgary.
- Rennie Intelligence. (2018). *Population Projections for the Calgary Metropolitan Regional Board*. Calgary.
- Simflo Systems Ltd. (2014). *Hamlet of Langdon Infrastructure Report*. Langdon.
- Stantec. (2014). *The City of Calgary Sanitary Long Range Plan*. Calgary.
- Urban Systems Ltd and MPE Engineering Ltd. (2016). *Foothills Regional Water and Wastewater Collaborative (FRWWC) Regional Wastewater Treatment Feasibility Study*. Calgary.
- Urban Systems Ltd. (2012). *Harmony Community Integrated Water Systems Master Plan (W4)*. Calgary.
- Urban Systems Ltd. (2012). *QUAD Regional Water Partnership Regional Raw and Treated Water Distribution Lines Preliminary Design Report*. Calgary.
- Urban Systems Ltd. (2014). *Cochrane Water and Wastewater Master Plan*. Calgary.
- Urban Systems Ltd. (2016). *Harmony Stage 2 and 3 Servicing Update*. Calgary.

Urban Systems Ltd. (2017). *Sanitary Sewer Strategy Preliminary Design Report*. Calgary.

WaterSMART. (2019). *Natural and Managed Capacity of Regional Water Supply in the Calgary Metropolitan Region*. Calgary.

[This page has intentionally left blank]

APPENDIX A:

Water Treatment Regional Systems Summary Sheets

Regional Infrastructure: City of Calgary Water Treatment	A-2
Regional Infrastructure: Bragg Creek Water Treatment	A-3
Regional Infrastructure: Harmony Water Treatment	A-4
Regional Infrastructure: Langdon Water Treatment	A-5
Regional Infrastructure: East Rocky View Water Treatment	A-6
Regional Infrastructure: Horse Creek Water Treatment	A-7
Regional Infrastructure: Cochrane Water Treatment	A-8
Regional Infrastructure: Heritage Pointe Water Treatment	A-9
Regional Infrastructure: SRUCC Water Treatment	A-10
Regional Infrastructure: Okotoks Water Treatment	A-11
Regional Infrastructure: High River Water Treatment	A-12

[This page has intentionally left blank]

Regional Infrastructure: City of Calgary Water Treatment

Infrastructure:

City of Calgary Water Treatment Plants

There are two water treatment plants in the City of Calgary. Glenmore WTP is located on the Glenmore reservoir and draws its water from the Glenmore Dam at the Elbow River. Glenmore WTP has a firm capacity of 400.0 MLD. The Bearspaw WTP is located in the Northwest Calgary and draws water from the Bow River. Bearspaw has a firm capacity of 550.0 MLD¹.

The subject study offered results of a high-level analysis of the servicing in Calgary Region. The City of Calgary has complex water and wastewater systems, with a number of source waters, treatment plants, reservoirs, pump stations, lift stations, etc, which could not be modelled within the scope and budget of this study. The readers should be aware that the results of the study are not indicative of the capacity of The City of Calgary's system, which is designed to accommodate the planned growth for inside City of Calgary customers, and servicing contracts with existing Regional Customers. The assumptions for The City of Calgary's data did not consider important factors, such as climate change (drought/ flood), raw water security and license limitations, changing population projections, planning criteria changes, water consumption predictions, economic climate impacts, as well as capital funding uncertainty impacting planned City of Calgary infrastructure upgrades.

Owner:

City of Calgary

**Maximum Day Demand Design
(Glenmore WTP and Bearspaw WTP)³:**
950.0 MLD

Type:

Conventional Water Treatment Plants

MDD:ADD Ratio⁴:
1.7

Service Areas:

Calgary, Airdrie, Strathmore, Chestermere, Tsuu T'ina Nation, Spruce Meadows, China National Offshore Oil Corporation

**Current Average Day Capacity
(Population Equivalent)⁵:**
1,624,000 people

Water Demands per Capita²:

345 L/c/d

¹ Firm capacity; provided by the City of Calgary.

² Weighted average of the per capita demands of each service area; City of Calgary's per capita demand in the formula is the design demand, not the City's actual per capita demand.

³ City of Calgary Water Long Range Plan, Associated Engineering, 2011.

⁴ City of Calgary Water Long Range Plan, Associated Engineering, Upcoming revisions to the plan.

⁵ Firm capacity; provided by the City of Calgary.

Regional Infrastructure: Bragg Creek Water Treatment

Infrastructure:

Bragg Creek Water Treatment Plant

The Bragg Creek Water Treatment Plant was built in 2011 and is located within the Hamlet.

Owner:

Rocky View County

Type⁶:

Conventional Treatment (Membrane Filtration)

Service Area:

Hamlet of Bragg Creek and Surrounding Area

Water Demands Per Capita⁷:

270 L/c/d

Maximum Day Demand Design⁸:

0.5 MLD

MDD:ADD Ratio⁹:

1.7

Current Capacity (Population Equivalent¹⁰):

719 people

⁶ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

⁷ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

⁸ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

⁹ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

¹⁰ Calculated based on the MDD:ADD Ratio, the maximum day treatment capacity of the WTP and the per capita demand.

Regional Infrastructure: Harmony Water Treatment

Infrastructure:

Harmony Water Treatment Plant

The Harmony Water Treatment Plant is located within the Harmony Development. It draws water from the Harmony Lake, which is supplemented from the Bow River.

Owner:

Harmony Advanced Water Systems Corporation (HAWSCO)

Type:

Conventional Treatment with Ultrafiltration

Service Area:

Harmony Development

Water Demands Per Capita¹¹:

272 L/c/d

Maximum Day Design Capacity¹²:

2.4 MLD

MDD:ADD Ratio¹³:

2.1

Current Capacity (Population Equivalent)¹⁴:

4,198 people

¹¹ Current demands are residential only and include system leakage and WTP waste.

¹² Firm capacity (one UF train out of service).

¹³ Harmony Community Integrated Water Systems Master Plan (W4), Urban Systems Ltd, 2012.

¹⁴ Harmony Stage 2 and 3 Servicing Update, Urban Systems Ltd, 2016.

Regional Infrastructure: Langdon Water Treatment

Infrastructure:

Langdon Water Treatment Plant

The Langdon Water Treatment Plant is located in the Hamlet of Langdon, and treats groundwater supplied by two wells for the Hamlet of Langdon.

Owner:

Langdon Waterworks Ltd.

Type:

Green Sand Filtration

Service Area:

Langdon

Water Demands Per Capita¹⁵:

230 L/c/d

Maximum Day Design Capacity¹⁶:

3.5 MLD

MDD:ADD Ratio¹⁷:

2.4

Current Capacity (Population Equivalent)¹⁸:

6,554 people

¹⁵ Average annual per capita demand. Hamlet of Langdon Infrastructure Report, Sim-Flo Systems Ltd, 2014.

¹⁶ 41 L/s Maximum Day capacity. Hamlet of Langdon Infrastructure Report, Sim-Flo Systems Ltd, 2014.

¹⁷ Hamlet of Langdon Infrastructure Report, Sim-Flo Systems Ltd, 2014.

¹⁸ Hamlet of Langdon Infrastructure Report, Sim-Flo Systems Ltd, 2014.

Regional Infrastructure: East Rocky View Water Treatment

Infrastructure:

East Balzac (Graham Creek) Water Treatment Plant

The East Balzac (Graham Creek) Water Treatment Plant is located east of Airdrie, and services the Balzac and Conrich areas.

Owner:

Rocky View County

Type:

Conventional Water Treatment Plant (DAF and Multimedia Filtration)

Service Area:

Balzac, Conrich

Water Demands Per Capita¹⁹:

380 L/c/d

Maximum Day Design Capacity²⁰:

5.9 MLD

MDD:ADD Ratio:

2

Current Capacity (Population Equivalent)²¹:

10,260 people

¹⁹ Weighted average of the service area per capita demands.

²⁰ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

²¹ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

Regional Infrastructure: Horse Creek Water Treatment

Infrastructure:

Horse Creek Water Treatment Plant

Horse Creek Water Treatment plant currently serves the Cochrane Lake community north of the Town of Cochrane. Technical information regarding the capacity of the Horse Creek WTP was not available at the time of the study.

Owner:

Horse Creek Water Services

Service Area:

Cochrane Lake

Maximum Day Design Capacity²²:

1.3 MLD

Current Capacity (Population Equivalent)²³:

3,640 people

²² Provided by Rocky View County, Utility servicing for Cochrane Lake Village (Macdonald, 2019)

²³ Provided by Rocky View County; 1300 homes at 2.8 ppu.

Regional Infrastructure: Cochrane Water Treatment

Infrastructure:

Town of Cochrane Water Treatment Plant

The Cochrane Water Treatment Plant is located along the Bow River in the West area of Town. It is currently undergoing a membrane expansion to add additional treatment capacity.

Owner:

Town of Cochrane

Type:

Conventional Water Treatment Plant

Service Area:

Town of Cochrane

Water Demands Per Capita²⁴:

283 L/c/d

Maximum Day Demand²⁵:

24 MLD

MDD:ADD Ratio²⁶:

1.8

Current Capacity (Population Equivalent):

47,114 people

²⁴ Provided by the Town of Cochrane.

²⁵ Currently installed firm capacity, limited by the intake capacity.

²⁶ Cochrane Water and Wastewater Master Plan, Urban Systems Ltd, 2014.

Regional Infrastructure: Heritage Pointe Water Treatment

Infrastructure:

Heritage Pointe Water Treatment Plant

This WTP is a privately owned WTP servicing Heritage Pointe only. Technical information regarding the system was not available.

Owner:

Corix Utilities

Service Area:

Heritage Pointe

Current Capacity (Population Equivalent)²⁷:

3750 people

²⁷ Approximate buildout provided by Foothills County; 1500 units at 2.5 ppv

Regional Infrastructure: SRUCC Water Treatment

Infrastructure:

Sheep River Regional Utilities Corporation Water Treatment Plant

The SRUCC Water Treatment Plant is located in Turner Valley and uses wells within an alluvial aquifer hydraulically connected to the Sheep River. It was constructed in 1998 and provides potable water for the service areas below²⁸.

Owner:

Sheep River Regional Utility Corporation

Service Area:

Town of Black Diamond, Town of Turner Valley and Millarville

Type:

Conventional Treatment (Direct Filtration)

Water Demands Per Capita²⁹:

279 L/c/d

Maximum Day Demand³⁰:

7.3 MLD

MDD:ADD Ratio³¹:

2.0

Current Capacity (Population Equivalent)³²:

13,096 people

²⁸ Water Inter-Municipal Partnership Feasibility Study, MPE Engineering, 2009.

²⁹ Weighted average of the service area per capita demands.

³⁰ Provided by the Sheep River Regional Utility Corporation.

³¹ Based on data provided by the Sheep River Regional Utility Corporation.

³² Provided by the Sheep River Regional Utility Corporation.

Regional Infrastructure: Okotoks Water Treatment

Infrastructure:

Town of Okotoks Water Treatment Plant

The Okotoks Water Treatment Plant is located on the Sheep River, in the center of the Town. It provides water to the residents of the Town.

Owner:

Town of Okotoks

Type:

Conventional Water Treatment

Service Area:

Town of Okotoks

Water Demands Per Capita³³:

295 L/c/d

Maximum Day Demand³⁴:

18 MLD

MDD:ADD Ratio³⁵:

1.5

Current Capacity (Population Equivalent)³⁶:

40,678 people

³³ Provided by the Town of Okotoks.

³⁴ Provided by the Town of Okotoks.

³⁵ Provided by the Town of Okotoks.

³⁶ Provided by the Town of Okotoks.

Regional Infrastructure: High River Water Treatment

Infrastructure:

Town of High River Water Treatment Plant

The Town of High River Water Treatment Plant is located within the town and draws water from high quality groundwater under direct surface influence. It provides potable water to the residents of High River, Cayley, Highway 2A Industrial Corridor, Aldersyde, Cargill Plant and Mazeppa.

Owner:

Town of High River

Type:

Conventional Water Treatment

Service Areas:

Town of High River, Cargill, Highway 2A Industrial Corridor, Aldersyde, Cayley, Mazeppa

Water Demands Per Capita³⁷:

404 L/c/d

Maximum Day Demand³⁸:

28.3 MLD

MDD:ADD Ratio³⁹:

1.5

Current Capacity (Population Equivalent):

46,669 people

³⁷ Weighted average of the service area demands.

³⁸ 327 L/s as provided by Town of High River

³⁹ High River Utility Master Plan, ISL, 2017

[This page has intentionally left blank]

APPENDIX B:

Water Corridors Regional Systems Summary Sheets

Regional Infrastructure: Airdrie Water Corridor.....	B-14
Regional Infrastructure: Calgary to Chestermere Water Corridor.....	B-15
Regional Infrastructure: Calgary to Strathmore Water Corridor.....	B-16
Regional Infrastructure: East Balzac Water Corridor.....	B-17
Regional Infrastructure: Conrich Water Corridor.....	B-18
Regional Infrastructure: Cayley Water Corridor.....	B-19
Regional Infrastructure: Turner Valley to Black Diamond Water Corridor.....	B-20
Regional Infrastructure: Turner Valley to Millarville Water Corridor.....	B-21
Regional Infrastructure: High River to Cargill Water Corridor.....	B-22
Regional Infrastructure: High River to Aldersyde Water Corridor.....	B-23

[This page has intentionally left blank]

Regional Infrastructure: Airdrie Water Corridor

Infrastructure:

Calgary to Airdrie Water Mains

The City of Airdrie receives potable water through three major transmission mains from the City of Calgary⁴⁰.

Owner:

City of Airdrie

Water Demands Per Capita⁴³:

274 L/c/d

Physical Attributes⁴¹:

- 350mm Yellow Jacket Steel installed in 1976*
 - » Approximately 12.3km
- 900mm Concrete (AWWA C301L) installed in 1981*
 - » Approximately 12.4 km
- 600mm PVC installed in 2013
 - » Approximately 9 km

**Please note that the 350mm pipe is nearing the end of its service life, therefore Airdrie has advised not to include it in the corridor capacity.*

The 900mm main is operated at a low pressure to mitigate water security risk in the event of a failure. Detailed analysis is required to determine if the capacity of this main can be increased.

Service Area:

City of Airdrie

Current Capacity (Population Equivalent)⁴²:

85,000 people

MDD:ADD Ratio:

2.0

Service Agreements:

- City of Airdrie Master Servicing Agreement (2019 Update in draft)
- 2019 Agreement Capacity: 34.8 ML/day (maximum); 7048 ML/year (maximum)
- 2031-2031 Agreement Capacity: 68.5 ML/day (maximum); 13,896 ML/year (maximum)

⁴⁰ Airdrie Utility Master Plan, ISL, 2016.

⁴¹ Airdrie Utility Master Plan, ISL, 2016.

⁴² Provided by City of Airdrie.

⁴³ Provided by the City of Airdrie.

Regional Infrastructure: Calgary to Chestermere Water Corridor

Infrastructure:

Calgary to Chestermere Water Mains

The East Calgary Regional Water Line (ECRWL) runs from Calgary to Strathmore and currently serves both Chestermere and Strathmore. It runs from 52nd ST and 50th AV SE in Calgary to the eastern edge of Chestermere before tapering to 750mm, prior to heading to Strathmore. Chestermere is also serviced via a 300mm water main running along 17th avenue SE. The capacity of this corridor reflects Chestermere's 34% allocation of the ECRWL and the full capacity of the 300 mm main.

Owner⁴⁴:

- ECRWL owned by Town of Strathmore
- 300mm Main owned by City of Chestermere

Capacity of Pipeline⁴⁷:

- ECRWL: 271 L/s
- 300mm Main
 - » 110 L/s

Physical Attributes⁴⁵:

- ECRWL Size and Material: 900-750 mm Concrete (AWWA C301L), Steel
 - » Length: Approximately 10 km
 - » Age: 2009
- 300MM PVC Main
 - » Length: 5km
 - » Age: 1990

MDD:ADD Ratio⁴⁸:

1.8

Current Capacity (Population Equivalent):

67,733 people

Service Area:

City of Chestermere

Service Agreements:

- City of Chestermere Master Servicing Agreement (2016)
- 2019 – 2022 Agreement Capacity: 18.4 ML/day (maximum); 3275 ML/year (maximum)
- 2031 - 2034 Agreement Capacity: 32.6 ML/day (maximum); 5,810 ML/year (maximum)

Water Demands Per Capita⁴⁶:

270 L/c/d

⁴⁴ Information provided by City of Chestermere.

⁴⁵ Town of Strathmore Master Servicing Study Update 2012, Information provided by City of Chestermere.

⁴⁶ Information provided by City of Chestermere.

⁴⁷ Information provided by City of Chestermere.

⁴⁸ Pipeline designed to deliver MDD. Ratio is an assumed value based on other service areas in the region.

Regional Infrastructure: Calgary to Strathmore Water Corridor

Infrastructure:

Calgary to Strathmore Water Main

The East Calgary Regional Water Line (ECRWL) runs from Calgary to Strathmore and currently serves both Chestermere and Strathmore. This sheet refers to the section of pipeline from Chestermere to Strathmore only, which starts as a 750mm running east from Chestermere to Range Road 272, before tapering to a 600/500mm prior to entering Strathmore's Town boundary on Highway 1.

The capacity of this corridor reflects Strathmore's 66% allocation of the ECRWL. Rocky View County and Wheatland County can each obtain 15% allocation in the future at a capital cost and maintenance reimbursement to Strathmore⁴⁹.

Owner⁵⁰:

Town of Strathmore

Pipeline Design Capacity (Population Equivalent)⁵³:

103,220 people

Physical Attributes⁵¹:

- Size and Material: 750/600/500mm PVC
- Length: Approximately 33 km
- Age: 2009

Service Agreements:

- Town of Strathmore Master Servicing Agreement
- 2019 Agreement Capacity: 8.64 ML/day (maximum); 1535 ML/year (maximum)
- 2031 - 2034 Agreement Capacity: 13.0 ML/day (maximum); 2,559 ML/year (maximum)

Service Area:

Town of Strathmore

Water Demands Per Capita⁵²:

246 L/c/d

MDD:ADD Ratio:

1.8

⁴⁹ Strathmore Data Request Document, May 2019.

⁵⁰ Information provided by City of Chestermere.

⁵¹ Town of Strathmore Master Servicing Study Update 2012.

⁵² Information provided by Town of Strathmore.

⁵³ Based on Strathmore's 66% allocation (529 L/s) of full design capacity.

Regional Infrastructure: East Balzac Water Corridor

Infrastructure:

East Balzac Water Treatment Plant to Balzac Reservoir

Owner:

Rocky View County

Physical Attributes:

- Size⁵⁴: 400mm
- Length: Approximately 18 km

Service Area:

Balzac

Water Demands Per Capita⁵⁵:

380 L/c/d

Pipeline Design Capacity⁵⁶:

12.2 MLD

MDD:ADD Ratio⁵⁷:

2

Current Capacity (Population Equivalent):

16,008 people

54 Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

55 Assumed Value based on Conrich demands.

56 Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

57 Balzac Master Potable Water Plan, MPE Engineering 2012.

Regional Infrastructure: Conrich Water Corridor

Infrastructure:

East Balzac Water Treatment Plant to Conrich Reservoir

Owner:

Rocky View County

Physical Attributes:

- Size⁵⁸: 300mm
- Length: Approximately 22 km

Service Area:

Conrich

Water Demands Per Capita⁵⁹:

380 L/c/d

Pipeline Design Capacity⁶⁰:

5.7 MLD

MDD:ADD Ratio⁶¹:

2

Current Capacity (Population Equivalent):

7,716 people

58 Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

59 Rocky View County Conrich Potable Water Network Plan Final Report, MPE Engineering Ltd, August 2013.

60 Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

61 Balzac Master Potable Water Plan, MPE Engineering 2012.

Regional Infrastructure: Cayley Water Corridor

Infrastructure:

High River to Cayley Watermain

The Cayley water main runs directly south from High River providing the Hamlet of Cayley with potable water.

Owner:

Foothills County

Physical Attributes⁶²:

- Size: 100mm
- Length: Approximately 12 km

Service Area:

Hamlet of Cayley

Current Capacity (Population Equivalent)⁶³:

2430 people

MDD:ADD Ratio⁶⁴:

1.5

⁶² Size provided from Foothills County.

⁶³ Calculated theoretical capacity based off main size and a maximum velocity assumption of 1.5m/s.

⁶⁴ High River Utility Master Plan, ISL 2017.

Regional Infrastructure: Turner Valley to Black Diamond Water Corridor

Infrastructure:

Sheep River Regional Utility Corporation Regional Water Line

The Town of Black Diamond is serviced from the Sheep River Regional Utility Corporation Water Treatment Plant located in Turner Valley.

Owner:

Sheep River Regional Utility Corporation

Physical Attributes:

- Size and Material: 250/300mm HDPE DR11
- Length: Approximately 6.5 km
- Age: 2014

Service Area:

Black Diamond

Water Demands Per Capita:

330 L/c/d

Pipeline Design Capacity⁶⁵:

4.2 MLD

MDD:ADD Ratio:

1.8

Current Capacity (Population Equivalent):

7,264 people

65 QUAD Regional Water Partnership Regional Raw and Treated Water Distribution Lines Preliminary Design Report, Urban Systems Ltd, 2012.

Regional Infrastructure: Turner Valley to Millarville Water Corridor

Infrastructure:**Sheep River Regional Utility Corporation Waterline to Millarville**

The Hamlet of Millarville is serviced from the Sheep River Regional Utility Corporation Water Treatment Plant located in Turner Valley.

Owner:

Sheep River Regional Utility Corporation

Physical Attributes:

The attributes were not available for the study.

Service Area:

Millarville

Water Demands Per Capita:

410 L/c/d

Current Capacity (Population Equivalent)⁶⁶:

890 people

⁶⁶ Based off of SRUCC allocation in absence of other information.

Regional Infrastructure: High River to Cargill Water Corridor

Infrastructure:

High River to Cargill Watermain

High River provides potable water north along Highway 2A. The main begins as a 300mm up to Cargill Foods, and then tapers to a 200mm as it heads north to Aldersyde. This sheet refers to the section from High River to Cargill Foods.

Owner:

Foothills County

Physical Attributes:

- **Size:** 300 mm
- **Length:** Approximately 5 km

Service Area:

Cargill Foods, Hamlet of Aldersyde, Warner Business Park, Silvertip, Highway 2A ASP Corridor

Water Demands Per Capita⁶⁷:

444 L/c/d

Pipeline Design Capacity⁶⁸:

9.0 MLD

MDD:ADD Ratio⁶⁹:

1

Current Capacity (Population Equivalent):

20,270 people

⁶⁷ Highway 2A ASP Water Servicing Report, MPE Engineering, 2010.

⁶⁸ Calculated theoretical capacity based off main size and a maximum velocity assumption of 1.5m/s.

⁶⁹ High River Utility Master Plan, ISL Engineering and Land Services, 2017.

Regional Infrastructure: High River to Aldersyde Water Corridor

Infrastructure:

High River to Aldersyde Watermain

High River provides potable water north along Highway 2A. The main begins as a 300mm up to Cargill Foods, and then tapers to a 200mm as it heads north to Aldersyde. This sheet refers to the section after Cargill Foods.

Owner:

Foothills County

Physical Attributes:

- **Size:** 200 mm
- **Length:** Approximately 5.3km

Service Area:

Hamlet of Aldersyde, Warner Business Park, Silvertip,
Highway 2A ASP

Water Demands Per Capita⁷⁰:

404 L/c/d

Pipeline Capacity⁷¹:

4.1 MLD

MDD:ADD Ratio⁷²:

2

Current Capacity (Population Equivalent):

5,055 people

⁷⁰ Weighted average of service area demands.

⁷¹ Calculated theoretical capacity based off main size and a maximum velocity assumption of 1.5m/s.

⁷² High River Utility Master Plan, ISL Engineering and Land Services, 2017.

APPENDIX C:

Wastewater Treatment Regional Systems Summary Sheets

Regional Infrastructure: City of Calgary Wastewater Treatment	C-25
Regional Infrastructure: City of Calgary Wastewater Treatment	C-26
Regional Infrastructure: Langdon Wastewater Treatment	C-27
Regional Infrastructure: Bragg Creek Wastewater Treatment	C-28
Regional Infrastructure: Harmony Wastewater Treatment	C-29
Regional Infrastructure: Westend Wastewater Treatment	C-30
Regional Infrastructure: High River Wastewater Treatment	C-31
Regional Infrastructure: Okotoks Wastewater Treatment	C-32
Regional Infrastructure: Strathmore Wastewater Treatment	C-33

[This page has intentionally left blank]

Regional Infrastructure: City of Calgary Wastewater Treatment

Infrastructure:

Bonnybrook Wastewater Treatment Plant

Bonnybrook WWTP is located in the Central/Southeast of Calgary. It is the largest WWTP in the region, treating the majority of Calgary's sanitary flows, as well as wastewater from Cochrane, Cochrane Lake, Airdrie, and Elbow Valley, and Tsuu T'ina Nation (North). The City refers to Bonnybrook's service area as the "North Catchment".

The subject study offered results of a high-level analysis of the servicing in Calgary Region. The City of Calgary has complex water and wastewater systems, with a number of source waters, treatment plants, reservoirs, pump stations, lift stations, etc, which could not be modelled within the scope and budget of this study. The readers should be aware that the results of the study are not indicative of the capacity of The City of Calgary's system, which is designed to accommodate the planned growth for inside City of Calgary customers, and servicing contracts with existing Regional Customers. The assumptions for The City of Calgary's data did not consider important factors, such as climate change (drought/ flood), biological loadings, changing population projections, planning criteria changes, water consumption predictions, economic climate impacts, as well as capital funding uncertainty impacting planned City of Calgary infrastructure upgrades.

Owner:

City of Calgary

Wastewater Generation Rate Per Capita (North Catchment)⁷³:

411 L/c/d

Type:

Tertiary Wastewater Treatment

Current Capacity (Population Equivalent)⁷⁴:

1,128,700 people

Service Area:

City of Calgary, City of Airdrie, Town of Cochrane, Cochrane Lake, Elbow Valley, and Tsuu T'ina Nation (North)

⁷³ City of Calgary Sanitary Long Range Plan, Stantec, 2014.

⁷⁴ Firm capacity, provided by the City of Calgary. This capacity includes Bonnybrook WWTP upgrades.

Regional Infrastructure: City of Calgary Wastewater Treatment

Infrastructure:

Pine Creek and Fish Creek Wastewater Treatment Plants

Pine Creek and Fish Creek WWTPs are located in the deep Southeast of Calgary. These WWTPs treat a portion of Calgary's sanitary flows, as well as wastewater from Chestermere and Tsuu T'ina Nation (South). They can be treated as one treatment system for the south catchment in Calgary as flows may be pumped between them⁷⁵. Both WWTPs discharge to the Bow River. The City refers to the Pine Creek and Fish Creek service area as the "South Catchment".

The subject study offered results of a high-level analysis of the servicing in Calgary Region. The City of Calgary has complex water and wastewater systems, with a number of source waters, treatment plants, reservoirs, pump stations, lift stations, etc, which could not be modelled within the scope and budget of this study. The readers should be aware that the results of the study are not indicative of the capacity of The City Calgary's system, which is designed to accommodate the planned growth for inside City of Calgary customers, and servicing contracts with existing Regional Customers. The assumptions for The City of Calgary's data did not consider important factors, such as climate change (drought/ flood), biological loadings, changing population projections, planning criteria changes, economic climate impacts, as well as capital funding uncertainty impacting planned City of Calgary infrastructure upgrades.

Owner:

City of Calgary

Wastewater Generation Rate Per Capita (South Catchment)⁷⁶:

326 L/c/d

Type:

Tertiary Wastewater Treatment

Current Capacity (Population Equivalent)⁷⁷:

363,000 people

Service Area:

City of Calgary, City of Chestermere, Tsuu T'ina Nation (South)

⁷⁵ City of Calgary Sanitary Long Range Plan, Stantec, 2014.

⁷⁶ City of Calgary Sanitary Long Range Plan, Stantec, 2014.

⁷⁷ Provided by the City of Calgary.

Regional Infrastructure: Langdon Wastewater Treatment

Infrastructure:**Langdon Wastewater Treatment Plant**

The Langdon Wastewater Treatment Plant is a tertiary plant that discharges its effluent to Weed Lake. It is located east of the Hamlet of Langdon.

Owner:

Rocky View County

Type:

Tertiary, Sequential Batch Reactor

Service Area:

Langdon, Balzac, Conrich

Wastewater Generation Rate Per Capita⁷⁸:

336 L/c/d

Design Average Daily Flow⁷⁹:

3.7 MLD

Current Capacity (Population Equivalent):

11,016 people

⁷⁸ Weighted average of Service Areas.

⁷⁹ Rocky View County Water and Wastewater Offsite Levy Study, MPE Engineering, 2018.

Regional Infrastructure: Bragg Creek Wastewater Treatment

Infrastructure:

Bragg Creek Wastewater Treatment Plant

The Bragg Creek Wastewater Treatment Plant is located within the Hamlet boundary, and services the Hamlet and surrounding Bragg Creek Area. It discharges to the Elbow River.

Owner:

Rocky View County

Type⁸⁰:

Membrane Bioreactor with UV disinfection

Age⁸¹:

- Phase 1: 2012
- Phase 2: 2014

Service Area:

Bragg Creek Hamlet and Surrounding Area

Wastewater Generation Rate Per Capita⁸²:

250 L/c/d

Design Average Daily Flow⁸³:

0.3 MLD

Current Capacity (Population Equivalent)⁸⁴:

1,143 people

⁸⁰ Rocky View County Water and Wastewater Offsite Levy Study, MPE Engineering, 2018.

⁸¹ Rocky View County Water and Wastewater Offsite Levy Study, MPE Engineering, 2018.

⁸² Rocky View County Water and Wastewater Offsite Levy Study, MPE Engineering, 2018.

⁸³ Rocky View County Water and Wastewater Offsite Levy Study, MPE Engineering, 2018.

⁸⁴ Rocky View County Water and Wastewater Offsite Levy Study, MPE Engineering, 2018.

Regional Infrastructure: Harmony Wastewater Treatment

Infrastructure:**Harmony Wastewater Treatment Plant**

The Harmony Wastewater Treatment Plant is located within the Harmony Development, directly north of Springbank Airport. It is designed to service the entire development and discharges to a storage pond to provide irrigation for the development Golf Course and parks spaces.

Owner:

Harmony Advanced Water Systems Corporation (HAWSCO)

Type:

Tertiary Treatment with UV disinfection

Age:

2018

Service Area:

Harmony Development

Wastewater Generation Rate Per Capita:

337 L/c/d

Design Average Daily Flow⁸⁵:

0.6 MLD

Current Capacity (Population Equivalent)⁸⁶:

2,789 people

⁸⁵ Harmony Stage 2 and 3 Servicing Update, Urban Systems Ltd, 2016.

⁸⁶ Based on currently installed equipment. Harmony Stage 2 and 3 Servicing Update, Urban Systems Ltd, 2016.

Regional Infrastructure: Westend Wastewater Treatment

Infrastructure:**Westend Regional Sewage Services Commission Wastewater Treatment Plant**

The Westend Wastewater Treatment Plant is an aerated lagoon approaching 25 years of operation. It is located north of the Town of Black Diamond and treats all sanitary flows from the Towns of Black Diamond and Turner Valley.

Owner:

Westend Regional Sewage Services Commission

Type:

Aerated Lagoon

Age:

Approximately 25 years

Service Area:

Black Diamond, Turner Valley

Wastewater Generation Rate Per Capita⁸⁷:

437 L/c/d

Design Average Daily Flow⁸⁸:

2.3 MLD

Current Capacity (Population Equivalent):

5,212 people

⁸⁷ Westend Regional Sewage Services Commission Plan for Operating Approval, MPE Engineering, 2015.

⁸⁸ Westend Regional Sewage Services Commission Plan for Operating Approval, MPE Engineering, 2015.

Regional Infrastructure: High River Wastewater Treatment

Infrastructure:

High River Wastewater Treatment Plant

The wastewater treatment plant for High River is located to the north along Highway 2A. It is an aerated lagoon system that discharges to Frank Lake.

Owner:

Town of High River

Type:

Lagoon

Service Area:

Town of High River, Abild's Industrial Park

Wastewater Generation Rate Per Capita⁸⁹:

200 L/c/d

Maximum Design Flow⁹⁰:

8,903 m³/day

Peaking Factor⁹¹:

2.4

Current Capacity (Population Equivalent):

18,548 people

⁸⁹ Calculated from updated flow information from Town of High River

⁹⁰ Town of High River Alternate Upgrades Study to the Wastewater Treatment Facilities, BSEI, 2011

⁹¹ Calculated from updated flow information from Town of High River

Regional Infrastructure: Okotoks Wastewater Treatment

Infrastructure:**Okotoks Wastewater Treatment Plant**

The Okotoks Wastewater Treatment Plant is located on the east side of Town and services the Town of Okotoks.

Owner:

Town of Okotoks

Type:

Tertiary Treatment

Service Area:

Town of Okotoks

Wastewater Generation Rate Per Capita⁹²:

237 L/c/d

Design Average Daily Flow⁹³:

10.0 MLD

Current Capacity (Population Equivalent):

42,194 people

⁹² Provided by the Town of Okotoks.

⁹³ Provided by the Town of Okotoks.

Regional Infrastructure: Strathmore Wastewater Treatment

Infrastructure:

Strathmore Wastewater Treatment Plant

The Town of Strathmore's wastewater treatment plant is a tertiary treatment plant, upgraded in 2010 to a conventional Biological Nutrient Removal plant. The plant discharges to an outfall located in a secondary channel of the Bow River approximately 21 km from the Town⁹⁴.

Owner:

Town of Strathmore

Type:

Tertiary

Service Area:

Town of Strathmore

Wastewater Generation Rate Per Capita⁹⁵:

432 L/c/d

Current Capacity (Population Equivalent)⁹⁶:

30,000 people

⁹⁴ Town of Strathmore Master Servicing Study – 2017 Update, AllNorth, 2017.

⁹⁵ Town of Strathmore Master Servicing Study – 2017 Update, AllNorth, 2017.

⁹⁶ Town of Strathmore Master Servicing Study – 2017 Update, AllNorth, 2017.

[This page has intentionally left blank]

APPENDIX D:

Wastewater Corridors Regional Systems Summary Sheets

Regional Infrastructure: Airdrie to Calgary Wastewater Corridor	D-35
Regional Infrastructure: Chestermere Wastewater Corridor	D-36
Regional Infrastructure: Cochrane Lake Wastewater Corridor	D-37
Regional Infrastructure: Cochrane to Calgary Wastewater Corridor	D-38
Regional Infrastructure: Balzac to Conrich Wastewater Corridor	D-39
Regional Infrastructure: Conrich to Langdon Wastewater Corridor	D-40
Regional Infrastructure: Elbow Valley to Calgary Wastewater Corridor	D-41

[This page has intentionally left blank]

Regional Infrastructure: Airdrie to Calgary Wastewater Corridor

Infrastructure:

Airdrie to Calgary Wastewater Forcemains

Three forcemains convey all of Airdrie's wastewater approximately 10km to Calgary, discharging in the North areas of Calgary's sanitary collection system. The flows are carried through Calgary to the Bonnybrook WWTP. This infrastructure is governed by the City of Airdrie and Calgary's Master Servicing Agreement, which was in draft at the time of this study.

Owner:

City of Airdrie

Current Capacity (Population Equivalent):

81,057 people

Physical Attributes (Total of 3 Forcemains to Calgary)⁹⁷:

- 350mm YDI installed in 1978
- 600mm HDPE installed in 1981
- 600mm PVC installed in 2007

Service Agreements:

- City of Airdrie Master Servicing Agreement (2019 Update in draft)
- 2019 Agreement Capacity: 42.1 ML/day (maximum); 6151 ML/year (maximum)
- 2031 - 2034 Agreement Capacity: 88.5 ML/day (maximum); 12,923 ML/year (maximum)

Service Area:

City of Airdrie

Corridor Capacity (all 3 pipelines)⁹⁸:

933 L/s

Wastewater Generation Rate Per Capita⁹⁹:

255 L/c/d

Peaking Factor¹⁰⁰:

3.9

⁹⁷ Airdrie Utility Master Plan, ISL, 2016.

⁹⁸ Airdrie Utility Master Plan, ISL, 2016.

⁹⁹ Airdrie Utility Master Plan, ISL, 2016.

¹⁰⁰ Airdrie Utility Master Plan, ISL, 2016.

Regional Infrastructure: Chestermere Wastewater Corridor

Infrastructure:

Chestermere to Calgary Wastewater Force mains

The City of Chestermere has a wastewater collection system consisting of 13 lift stations. There are two force mains that convey wastewater to the City of Calgary, and the flows to Calgary are governed by the City of Chestermere Master Servicing Agreement.

Owner:

City of Chestermere

Current Capacity (Population Equivalent):

52,160 people

Physical Attributes¹⁰¹:

- Size and Material: 450mm HDPE
 - » Length: Approximately 8 km
- Size and Material: 600mm PVC
 - » Length: Approximately 5.5 km
- Size and Material: 250mm HDPE
 - » For emergency use only (capacity not included)

Service Agreements:

- City of Chestermere Master Servicing Agreement (2016)
- Total 2019-2022 Agreement Capacity: 19.8 ML/day (maximum); 2778 ML/year (maximum)
- Total 2031 - 2034 Agreement Capacity: 35.1 ML/day (maximum); 4,929 ML/year (maximum)

Service Area:

City of Chestermere

Pipeline Capacity¹⁰²:

652 L/s

Wastewater Generation Rate Per Capita¹⁰³:

240 L/c/d

Peaking Factor¹⁰⁴:

4.5

101 City of Chestermere Utilities Master Plan, February 2017; Provided by City of Chestermere

102 Combined capacity of the 450mm and 600mm main based on a theoretical maximum velocity of 1.5m/s.

103 Provided by City of Chestermere.

104 Assumption, provided by the City of Chestermere.

Regional Infrastructure: Cochrane Lake Wastewater Corridor

Infrastructure:

Cochrane Lake to Town of Cochrane Wastewater Forcemain

Cochrane Lake pumps its wastewater through a forcemain running south along Horse Creek Road towards Cochrane where it is ultimately pumped to Calgary.

Owner:

Horse Creek Sewer Services

Current Capacity (Population Equivalent):

10,368 people

Physical Attributes¹⁰⁵:

- Size and Material: 250mm PVC Series 200
- Length: Approximately 5 km
- Age: 2003

Service Agreements:

- Town of Cochrane Master Servicing Agreement (2017)
- Agreement Capacity: 36 L/s with an additional 12 L/s allowed in the undefined area adjacent to the Cochrane Lake Service Area (Instantaneous Maximum)

Service Area:

Cochrane Lake

Pipeline Capacity¹⁰⁶:

72 L/s

Wastewater Generation Rate Per Capita¹⁰⁷:

200 L/c/d

Peaking Factor¹⁰⁸:

3

¹⁰⁵ Cochrane Lakes Development Offsite Pipelines Record Drawings, Medallion Cochrane Lakes Land Development Corp., December 2003.

¹⁰⁶ Utility Servicing for Cochrane Lake Village, Macdonald Communities Ltd., May 2019; Note this capacity is higher than the service agreement.

¹⁰⁷ Utility Servicing for Cochrane Lake Village, Macdonald Communities Ltd., May 2019.

¹⁰⁸ Assumed value, based on other regional wastewater forcemains.

Regional Infrastructure: Cochrane to Calgary Wastewater Corridor

Infrastructure:

Cochrane to Calgary Wastewater Forcemain

One force main conveys all of Cochrane's and Cochrane Lake's wastewater approximately 19km to Calgary. The flows are carried through Calgary's collection system infrastructure to the Bonnybrook WWTP. This infrastructure is governed by the Town of Cochrane and Calgary's Master Servicing Agreement.

Owner:

Town of Cochrane

Current Capacity (Population Equivalent):

31,418 people

Physical Attributes¹⁰⁹:

- Size and Material: 450mm – 600mm HDPE PVC
- Length: Approximately 19km
- Age: 1998

Service Agreements:

- Town of Cochrane Master Servicing Agreement (2017). This MSA applies to services the Town of Cochrane, Cochrane Lake and Springbank School boundaries.
- 2019-2022 Agreement Capacity: 26.4 ML/day (maximum); 3439 ML/year (maximum)
- 2031 - 2034 Agreement Capacity: 56.2 ML/day (maximum); 7,322 ML/year (maximum)

Service Areas:

Town of Cochrane, Cochrane Lake, Springbank Schools

Force main Capacity¹¹⁰:

240 L/s

Wastewater Generation Rate Per Capita¹¹¹:

220 L/c/d

Peaking Factor¹¹²:

3

¹⁰⁹ Town of Cochrane Master Servicing Agreement, 2017.

¹¹⁰ Sanitary Sewer Strategy Preliminary Design Report, Urban Systems Ltd., May 2017.

¹¹¹ Sanitary Sewer Strategy Preliminary Design Report, Urban Systems Ltd., May 2017.

¹¹² Sanitary Sewer Strategy Preliminary Design Report, Urban Systems Ltd May 2017.

Regional Infrastructure: Balzac to Conrich Wastewater Corridor

Infrastructure:

Balzac to Conrich Wastewater Transmission Main

The East Rocky View Wastewater Transmission Main (ERVVWTM) spans from Balzac to Langdon, taking flows from Balzac and Conrich to the Langdon wastewater treatment plant. The section of pipe from Balzac to Conrich is described below.

Owner:

Rocky View County

Physical Attributes¹¹³:

- Size and Material: 600mm PVC
- Length: Approximately 54 km
- Age: 2005 - 2007

Service Area:

Balzac

Force main Capacity¹¹⁴:

555 L/s

Wastewater Generation Rate Per Capita¹¹⁵:

346 L/c/d

Peaking Factor¹¹⁶:

5

Current Capacity (Population Equivalent):

27,693 people

¹¹³ Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

¹¹⁴ Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

¹¹⁵ Weighted average contributing of service area per capita flows.

¹¹⁶ Assumed value, based on high inflow and infiltration being reported.

Regional Infrastructure: Conrich to Langdon Wastewater Corridor

Infrastructure:

Conrich to Langdon Wastewater Transmission Main

The East Rocky View Wastewater Transmission Main (ERVWWTM) spans from Balzac to Langdon, taking flows from Balzac and Conrich to the Langdon wastewater treatment plant. The section of pipe from Conrich to Langdon is described below.

Owner:

Rocky View County

Physical Attributes¹¹⁷:

- Size and Material: 600mm PVC
- Length: Approximately 54 km
- Age: 2005 - 2007

Service Area:

Balzac, Conrich

Force main Capacity¹¹⁸:

620 L/s

Wastewater Generation Rate Per Capita¹¹⁹:

346 L/c/d

Peaking Factor¹²⁰:

4

Current Capacity (Population Equivalent):

38,671 people

¹¹⁷ Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

¹¹⁸ Rocky View County 2018 Off-Site Levy Final Report, MPE Engineering, 2018.

¹¹⁹ Weighted average of contributing service area per capita flows.

¹²⁰ Assumed value based on high inflow and infiltration being reported.

Regional Infrastructure: Elbow Valley to Calgary Wastewater Corridor

Infrastructure: Elbow Valley to Calgary Wastewater Forcemain

Physical Attributes¹²¹:

- Size and Material: 250mm HDPE

Service Area: Elbow Valley

Pipeline Capacity¹²²:

72 L/s

Wastewater Generation Rate Per Capita¹²³:

350 L/c/d

Peaking Factor¹²⁴:

4.5

Current Capacity (Population Equivalent):

4,005 people

Service Agreements¹²⁵:

- Highway 8 Corridor (Elbow Valley Wastewater)
- Agreement Capacity: 5.53 ML/day (maximum); 555 ML/year (maximum)

¹²¹ Provided by Rocky View County.

¹²² Maximum theoretical flow based on pipe diameter and a maximum velocity of 1.5 m/s. Note that this flow is higher than the service agreement.

¹²³ Assumption made in the absence of data.

¹²⁴ Assumption made in the absence of data.

¹²⁵ Provided by Rocky View County.

[This page has intentionally left blank]

APPENDIX E:

Service Area Summary Sheets

Service Area: City of Calgary	E-43
Service Area: City of Airdrie	E-44
Service Area: City of Chestermere	E-45
Service Area: Town of Strathmore	E-46
Service Area: Town of Cochrane	E-47
Service Area: Cochrane Lake	E-48
Service Area: Town of Okotoks	E-49
Service Area: Town of High River	E-50
Service Area: Hamlet of Cayley	E-51
Service Area: Town of Black Diamond	E-52
Service Area: Town of Turner Valley	E-53
Service Area: Hamlet of Millarville	E-54
Service Area: Hamlet of Aldersyde & Highway 2A Industrial Corridor	E-55
Service Area: East and West Balzac	E-56
Service Area: Harmony	E-57
Service Area: Hamlet of Langdon	E-58
Service Area: Hamlet of Bragg Creek	E-59
Service Area: Hamlet of Conrich	E-60
Service Area: Heritage Pointe	E-61
Service Area: Cargill Foods	E-62
Service Area: Elbow Valley	E-63
Service Area: Tsuu T'ina Nation	E-64

[This page has intentionally left blank]

Service Area: City of Calgary

The City of Calgary is a major regional provider of potable water supply to Calgarians, as well as, the communities of Airdrie, Chestermere, Strathmore, Spruce Meadows, China National Offshore Oil Corporation (CNOOC), and Tsuu T'ina Nation. The City also provides wastewater treatment for Calgarians and the communities of Airdrie, Cochrane, Cochrane Lake, Elbow Valley and Chestermere.

Current Population¹²⁶:

1,363,004

20-Year Projected Population¹²⁷:

1,839,329

2076 Population¹²⁸:

2,414,306

Existing Servicing Infrastructure

- **Water:** Glenmore WTP, Bearspaw WTP
- **Wastewater:** Bonnybrook WWTP, Pine Creek and Fish Creek WWTP

Water Demands Per Capita¹²⁹:

350 L/c/d

Wastewater Generation Rate Per Capita¹³⁰:

405 L/c/d

Water License¹³¹:

460,088,000 m³/year

126 Population Projections for the CMRB, Rennie Intelligence, 2018.

127 Population Projections for the CMRB, Rennie Intelligence, 2018.

128 City of Calgary Sanitary Long Range Plan, Stantec, 2014.

129 Provided by the City of Calgary.

130 Weighted Average of City demands for the two catchments.

131 CMRB Municipal Licenses, July 2019.

Service Area: City of Airdrie

The City of Airdrie is directly north of Calgary. It receives both water and wastewater servicing from the City of Calgary.

Current Population¹³²:

68,533

20-Year Population:

110,761

2076 Population:

171,931

Existing Servicing Infrastructure:

- **Water:** Calgary to Airdrie Water Transmission Mains Calgary Water Treatment
- **Wastewater:** Airdrie to Calgary Wastewater Force mains, Bonnybrook Wastewater Treatment Plant

Water Demands Per Capita¹³³:

274 L/c/d

Wastewater Generation Rate Per Capita¹³⁴:

255 L/c/d

Water License:

N/A

¹³² Population Projections for the CMRB, Rennie Intelligence, 2018. Used 2018 population and growth rate to project population.

¹³³ Provided by City of Airdrie.

¹³⁴ Airdrie Utility Master Plan, ISL, 2016.

Service Area: City of Chestermere

The City of Chestermere is located directly East of Calgary. They receive potable water and sanitary servicing from the City of Calgary.

Current Population¹³⁵:

21,416

20-Year Population:

40,582

2076 Population:

67,766

Existing Servicing:

- **Water:** East Calgary Regional Water Line, 300mm Water Main, Calgary Water Treatment
- **Wastewater:** Chestermere to Calgary Force mains, Pine Creek and Fish Creek WWTP

Water Demands Per Capita¹³⁶:

270 L/c/d

Wastewater Generation Rate Per Capita¹³⁷:

240 L/c/d

Water License:

N/A

¹³⁵ 2018 Population provided by City of Chestermere. Growth rates used were from 'Population Projections, Rennie Intelligence, 2018.

¹³⁶ City of Chestermere Municipal Context Document, 2019.

¹³⁷ Provided by City of Chestermere.

Service Area: Town of Strathmore

Strathmore is located directly East of Chestermere along the Trans-Canada Highway. It receives potable water through the East Calgary Regional Water Line after Chestermere. Strathmore's wastewater is treated at its own Wastewater Treatment Plant, located in the southeast of the Town.

Current Population¹³⁸:

13,969

20-Year Population:

22,787

2076 Population:

39,101

Existing Servicing:

- **Water:** East Calgary Regional Water Line, Calgary Water Treatment
- **Wastewater:** Strathmore Wastewater Treatment Plant

Water Demands Per Capita:

246 L/c/d

Wastewater Generation Rate Per Capita¹³⁹:

432 L/c/d

Water Licenses¹⁴⁰:

2,020,000 m³/Year

¹³⁸ 2018 Population provided by Town of Strathmore. Growth rates used were from 'Population Projections, Rennie Intelligence, 2018.

¹³⁹ Provided by the Town of Strathmore.

¹⁴⁰ Provided by the Town of Strathmore; License is transferred to the City of Calgary WTPs for potable water servicing.

Service Area: Town of Cochrane

The Town of Cochrane is located northwest of Calgary along Highway 1A. The Town has its own water treatment plant and receives wastewater treatment from the City of Calgary. The Town has eight treated water reservoirs and ten potable distribution pump stations. Five sanitary lift stations send flows to the transfer station which attenuates peak flows before pumping to the City of Calgary's collection system.

Current Population¹⁴¹:

29,277

20-Year Population:

42,512

2076 Population:

67,813

Existing Servicing

- **Water:** Cochrane Water Treatment Plant
- **Wastewater:** Cochrane to Calgary Wastewater Forcemain, Bonnybrook Wastewater Treatment Plant

Water Demands Per Capita:

283 L/c/d

Wastewater Generation Rate Per Capita:

220 L/c/d

Water License:

4,927,500 m³/year

¹⁴¹ Population from 2019 Town of Cochrane Census.

Service Area: Cochrane Lake

Cochrane Lake is a community north of Cochrane, within Rocky View County. A portion of the community has sanitary servicing through Cochrane that is ultimately sent to Calgary. The area is serviced by the Horse Creek Water Treatment Plant.

Current Population¹⁴²:

769

20-Year Population¹⁴³:

1,260

Buildout Population¹⁴⁴:

4,000

Existing Servicing

- **Water:** Horse Creek Water Treatment Plant
- **Wastewater:** Cochrane Lake to Cochrane Sanitary Forcemain, Cochrane to Calgary Wastewater Forcemain, Bonnybrook Wastewater Treatment Plant

Wastewater Generation Rate Per Capita¹⁴⁵:

200 L/c/d

Water License¹⁴⁶:

1,227,314 m³/year

¹⁴² Provided by Rocky View County.

¹⁴³ Provided by Rocky View County.

¹⁴⁴ Utility Servicing for Cochrane Lake Village, Macdonald Communities Ltd., May 2019.

¹⁴⁵ Utility Servicing for Cochrane Lake Village, Macdonald Communities Ltd., May 2019.

¹⁴⁶ Utility Servicing for Cochrane Lake Village, Macdonald Communities Ltd., May 2019.

Service Area: Town of Okotoks

The Town of Okotoks is south of Calgary and has its own water and wastewater servicing.

Current Population¹⁴⁷:

29,798

20-Year Population:

45,723

2076 Population:

75,183

Existing Servicing:

- **Water:** Okotoks Water Treatment Plant
- **Wastewater:** Okotoks Wastewater Treatment Plant

Water Demands Per Capita¹⁴⁸:

295 L/c/d

Wastewater Generation Rate Per Capita¹⁴⁹:

237 L/c/d

Water License¹⁵⁰:

3,773,971 m³/year

¹⁴⁷ 2018 census population provided by Town of Okotoks; Growth rates used were from 'Population Projections, Rennie Intelligence, 2018'.

¹⁴⁸ Provided by the Town of Okotoks.

¹⁴⁹ Provided by the Town of Okotoks.

¹⁵⁰ Provided by the Town of Okotoks.

Service Area: Town of High River

The Town of High River is located south of Okotoks in Foothills County. The Town has their own water and wastewater treatment servicing.

Current Population¹⁵¹:

15,217

20-Year Population:

23,050

2076 Population:

37,542

Existing Servicing:

- **Water:** High River Water Treatment Plant
- **Wastewater:** High River Lagoon

Water Demands Per Capita¹⁵²:

424 L/c/d

Wastewater Generation Rate Per Capita¹⁵³:

200 L/c/d

Water License¹⁵⁴:

4,624,093 m³/year

151 Population Projections for the CMRB, Rennie Intelligence, 2018.

152 Provided by Town of High River.

153 Calculated from updated flow information from Town of High River.

154 Provided by Town of High River.

Service Area: Hamlet of Cayley

The Hamlet of Cayley is located directly south of High River. It receives water from High River, and has its own wastewater lagoon, which is not large enough to be considered in this inventory.

Current Population¹⁵⁵:

369

20-Year Population:

642

Existing Servicing:

- **Water:** High River to Cayley Water main, High River Water Treatment Plant
- **Wastewater:** Lagoon (not being included in inventory as no regional potential)

Water Demands Per Capita¹⁵⁶:

270 L/c/d

Water License:

N/A

155 Projected from Canada Census.

156 Provided by Foothills County.

Service Area: Town of Black Diamond

The Town of Black Diamond is south of Calgary and west of Okotoks, along the Sheep River. It receives potable water from Turner Valley and has a wastewater treatment lagoon located north of the Town.

Current Population¹⁵⁷:

2,629

20-Year Population:

3,028

Buildout Population¹⁵⁸:

3,427

Existing Servicing:

- **Water:** Sheep River Regional Utility Corporation (SRRUC) Water Treatment Plant, Turner Valley to Black Diamond Water Main
- **Wastewater:** Westend Regional Sewage Services Commission (WRSSC) Wastewater Treatment Plant

Water Demands Per Capita:

330 L/c/d

Wastewater Generation Rate Per Capita¹⁵⁹:

437 L/c/d

Water License:

954,679 m³/year

¹⁵⁷ Projected from 2016 Canada Census.

¹⁵⁸ Foothills Regional Water and Wastewater Collaborative (FRWWC) Regional Wastewater Feasibility Study, MPE Engineering and Urban Systems, 2016.

¹⁵⁹ Westend Regional Sewage Services Commission, MPE Engineering Ltd., November 2015.

Service Area: Town of Turner Valley

The Town of Turner Valley is located southwest of Calgary, directly west of Black Diamond. It has a water treatment plant and its wastewater is sent to Black Diamond for treatment.

Current Population¹⁶⁰:

2,317

20-Year Population:

4,222

Buildout Population¹⁶¹:

6,126

Existing Servicing:

- **Water:** Sheep River Regional Utility, Corporation (SRRUC) WTP
- **Wastewater:** Westend Regional Sewage Services Commission (WRSSC) WWTP

Water Demands Per Capita:

218 L/c/d

Wastewater Generation Rate Per Capita¹⁶²:

437 L/c/d

Water License:

514,389 m³/year

160 Projected from 2016 Canada Census.

161 Joint Growth Strategy, May 2016.

162 Westend Regional Sewage Services Commission, MPE Engineering Ltd., November 2015.

Service Area: Hamlet of Millarville

Millarville is a small Hamlet north of Turner Valley on Highway 22. It receives water servicing from the Sheep River Regional Utility Corporation, and residents have their own private wastewater systems.

Current Population¹⁶³:

44

20-Year Population:

60

Existing Servicing:

- **Water:** Sheep River Regional Utility Corporation (SRRUC) Water Treatment Plant, Turner Valley to Millarville Water Main
- **Wastewater:** None (private systems)

Water Demands Per Capita:

410 L/c/d

Water License:

88,899 m³/year

¹⁶³ Provided from Foothills County.

Service Area: Hamlet of Aldersyde & Highway 2A Industrial Corridor

The Hamlet of Aldersyde is located along Highway 2A between Okotoks and High River. It receives water servicing from High River and has private septic systems. The Highway 2A Industrial Corridor is an ASP encompassing the Highway 2A corridor between the Town of High River and Okotoks. In this study, the residential areas of Silvertip, Ravencrest and the Hamlet of Aldersyde are included within the same service area as the Highway 2A ASP as they are intended to be serviced by the same water infrastructure. As the commercial and industrial development in this service area is significant compared to residential, a population equivalent has been estimated rather than only a residential population.

Currently these areas have no wastewater service but are intended to be serviced by the potential water and wastewater treatment plants in Aldersyde if the project moves forward.

Current Population Equivalent¹⁶⁴:

2,235

20-Year Population Equivalent:

6,314

Buildout Population Equivalent¹⁶⁵:

13,861

Existing Servicing:

- **Water:** High River to Aldersyde Water Main, High River Water Treatment Plant
- **Wastewater:** None (private systems)

Water Demands Per Capita¹⁶⁶:

444 L/c/d

Water License:

308,165 m³/year

¹⁶⁴ Approximate; population equivalents for the commercial/industrial areas were calculated based on existing water demands.

¹⁶⁵ Approximate; population equivalents for the residential and commercial/industrial areas were calculated based on the ASP buildout water demands. Highway 2A ASP Water Servicing Report, MPE Engineering, 2010.

¹⁶⁶ High River Utility Master Plan, ISL Engineering and Land Services, 2017.

Service Area: East and West Balzac

Balzac is located directly north of Calgary and south of Airdrie. It is split into two areas: East Balzac and West Balzac (on each side of Highway 2). The area is a mixture of residential and industrial/commercial development. As the commercial and industrial development in this service area is significant compared to residential, a population equivalent has been estimated rather than only a residential population based on the buildout water demands of the ASP.

Current Population Equivalent¹⁶⁷:

2,321

20-Year Population Equivalent:

18,630

Buildout Population Equivalent¹⁶⁸:

46,589

Existing Servicing

- **Water:** East Balzac Water Treatment Plant (Graham Creek), East Balzac Water Treatment Plant to Balzac Reservoir
- **Wastewater:** East Rocky View Wastewater Transmission Main, Langdon Wastewater Treatment Plant

Water Demands Per Capita¹⁶⁹:

380 L/c/d

Wastewater Generation Rate Per Capita¹⁷⁰:

320 L/c/d

Water License:

2,220,268 m³/year

¹⁶⁷ Provided by Rocky View County.

¹⁶⁸ Population Equivalents, Balzac Master Sanitary Plan, ISL, September 2013.

¹⁶⁹ Provided by Rocky View County.

¹⁷⁰ Balzac Master Sanitary Plan, ISL, September 2013.

Service Area: Harmony

Harmony is a development located west of Calgary, near the Springbank Airport within Rocky View County. It has its own water and wastewater servicing.

Current Population¹⁷¹:

254

20-Year Population¹⁷²:

7,863

Buildout Population:

15,726

Existing Servicing

- **Water:** Harmony Water Treatment Plant
- **Wastewater:** Harmony Wastewater Treatment Plant

Water Demands Per Capita¹⁷³:

272 L/c/d

Wastewater Generation Rate Per Capita:

337 L/c/d

Water License:

1,181,939 m³/year

171 Rocky View County 2018 Census.

172 Assumed half of the buildout population.

173 Harmony W4 Report Update, Urban Systems Ltd, 2016.

Service Area: Hamlet of Langdon

The Hamlet of Langdon is located east of Calgary and has its own Water and Wastewater Treatment Plants that serve other areas in addition to its own municipality.

Current Population¹⁷⁴:

5,370

20-Year Population:

7,979

Buildout Population¹⁷⁵:

13,400

Existing Servicing:

- **Water:** Langdon Water Treatment Plant
- **Wastewater:** Langdon Wastewater Treatment Plant

Water Demands Per Capita¹⁷⁶:

230 L/c/d

Wastewater Generation Rate Per Capita¹⁷⁷:

342 L/c/d

Water License¹⁷⁸:

724,088 m³/year

¹⁷⁴ Projected from 2016 Canada Census.

¹⁷⁵ Langdon ASP, 2016.

¹⁷⁶ Hamlet of Langdon Infrastructure Report, Sim-Flo Systems, 2014.

¹⁷⁷ Hamlet of Langdon Infrastructure Report, Sim-Flo Systems, 2014.

¹⁷⁸ Hamlet of Langdon Infrastructure Report, Sim-Flo Systems, 2014.

Service Area: Hamlet of Bragg Creek

The Hamlet of Bragg Creek is located west of the City of Calgary and is surrounded by country residential properties. The Hamlet, as well as other residences nearby are serviced by its own water and wastewater treatment plant.

Current Population¹⁷⁹:

459

20-Year Population:

1,303

Buildout Population¹⁸⁰:

2,147

Existing Servicing:

- **Water:** Bragg Creek Water Treatment Plant
- **Wastewater:** Bragg Creek Wastewater Treatment Plant

Water Demands Per Capita¹⁸¹:

270 L/c/d

Wastewater Generation Rate Per Capita¹⁸²:

250 L/c/d

Water License:

369,517 m³/year

¹⁷⁹ Rocky View County 2018 Census.

¹⁸⁰ Greater Bragg Creek ASP, Rocky View County, 2007.

¹⁸¹ Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

¹⁸² Rocky View County Water and Wastewater Offsite Levy Update, MPE Engineering, 2018.

Service Area: Hamlet of Conrich

The Conrich ASP is located east of Calgary and north of Chestermere. The ASP encompasses the Hamlet, which is the only area of Conrich that currently receives water servicing from the East Balzac Water Treatment Plant and sanitary servicing from the Langdon Wastewater Treatment Plant. As the commercial and industrial development in this service area is significant compared to residential, a population equivalent has been estimated rather than only a residential population based on the buildout water demands of the ASP.

Current Population¹⁸³:

21

20-Year Population Equivalent:

5,724

Buildout Population Equivalent¹⁸⁴:

11,427

Existing Servicing:

- **Water:** East Balzac Water Treatment Plant (Graham Creek), East Balzac Water Treatment Plant to Conrich Reservoir
- **Wastewater:** East Rocky View Wastewater Transmission Main, Langdon Wastewater Treatment Plant

Water Demands Per Capita¹⁸⁵:

380 L/c/d

Wastewater Generation Rate Per Capita¹⁸⁶:

342 L/c/d

Water License:

N/A

¹⁸³ Rocky View County 2018 Census.

¹⁸⁴ Conrich ASP Population Equivalent.

¹⁸⁵ Provided by Rocky View County.

¹⁸⁶ Conrich Wastewater Servicing Plan, MPE Engineering, 2013.

Service Area: Heritage Pointe

Heritage Pointe is a development directly south of the City of Calgary in Foothills County. It has its own water and wastewater servicing.

Current Population¹⁸⁷:

2,075

20-Year Population¹⁸⁸:

2,500

Existing Servicing:

- **Water:** Heritage Pointe Water Treatment Plant
- **Wastewater:** Heritage Pointe Wastewater Treatment Plant (not included in inventory as too small for regional potential)

Water Demands Per Capita¹⁸⁹:

270 L/c/d

Water License:

No Data Available

187 2016 Canada Census.

188 Approximate, from Foothills County.

189 Approximate, from Foothills County.

Service Area: Cargill Foods

Cargill Foods is a meat processing facility located off of Highway 2A, and receives potable water from High River, and has it's own wastewater treatment system that discharges to Frank Lake. Cargill is included as a service area because it has a significant water demand from High River that should be considered when evaluating infrastructure capacity.

Current Population Equivalent¹⁹⁰:

13,626

20-Year/Buildout Population¹⁹¹:

13,626

Existing Servicing:

- **Water:** High River Water Treatment Plant
- **Wastewater:** Private; not included in the analysis

Water Demands Per Capita¹⁹²:

444 L/c/d

Water License:

2,290,576 m³/year

¹⁹⁰ Based on a 2018 water demand of 2,208,210 m³/yr and a per capita equivalent demand of 444 L/c/d.

¹⁹¹ Direction from High River to assume Cargill demands will not increase in future.

¹⁹² Highway 2AASP Water Servicing Report, MPE Engineering, 2010.

Service Area: Elbow Valley

Elbow Valley is a community west of Calgary along Highway 8. At this time it has been assumed that the ASP is built out.

Current Population¹⁹³:

2,970

20-Year Population:

2,970

Buildout Population:

2,970

Existing Servicing:

- **Water:** Westridge WTP (not included in analysis)
- **Wastewater:**
 - » Elbow Valley to Calgary Wastewater Forcemain
 - » City of Calgary Wastewater Treatment

¹⁹³ Population Projections were not provided at time of study. Population was estimated as 990 dwelling units at 3 people per unit. Number of dwelling units was specified in the Elbow Valley ASP, 1997

Service Area: Tsuu T'ina Nation

Tsuu T'ina Nation is located west of Calgary spanning all the way to west of Bragg Creek. This service area is serviced by the City of Calgary for both water and wastewater. The information for the corridors was not provided however the demands were included for analysis of the Calgary Water and Wastewater Treatment Plants.

Current Population¹⁹⁴:

3,121

20-Year Population:

13,351

Buildout Population:

13,351

Existing Servicing:

- **Water:** Calgary Water Treatment Plant
- **Wastewater:** Calgary Wastewater Treatment Plant

194 All populations and projections were provided as assumptions by City of Calgary.