

JOINT GROWTH STRATEGY

May 2016

for the Towns of
Turner Valley +
Black Diamond

Turner Valley +
Black Diamond

**JOINT
GROWTH
STRATEGY**

Prepared for

Town of Black Diamond
Town of Turner Valley

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An Overview

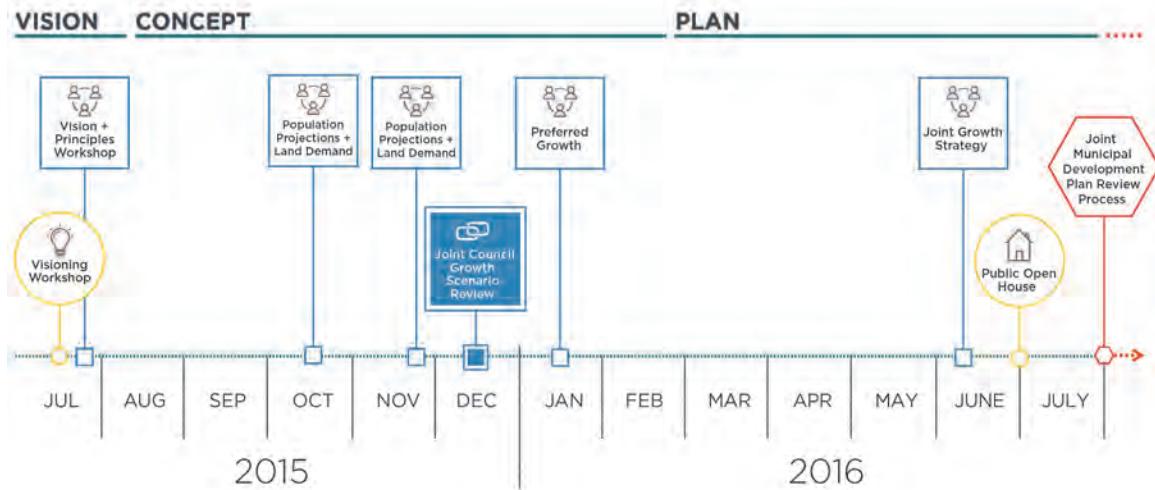
Overview

The *Turner Valley and Black Diamond Joint Growth Strategy* (the Joint Growth Strategy) is a coordinated effort between the two towns to define and plan for a shared vision of long-term growth. The vision in the Joint Growth Strategy will become the foundation for the Towns to review and update their Municipal Development Plans (MDPs), plan and coordinate future infrastructure investments, and work with the Municipal District of Foothills No. 31 (the MD of Foothills) to review and update the *Intermunicipal Development Plan*. As the towns have limited capacity for future growth within their existing boundaries, the Joint Growth Strategy will also inform future annexation processes.

The development of the Joint Growth Strategy included an assessment of: land needs (based on expected population growth), land suitability, and associated implications for infrastructure servicing. The Joint Growth Strategy illustrates efficient, responsible, and sustainable scenarios of future growth over the next 60 years. This document and process was guided by the Joint Advisory Committee (the Committee), a committee specially formed of members from the towns' councils to examine growth scenarios without considering town boundaries as constraints. The Joint Growth Strategy presents three scenarios of growth, the last of which the Committee has identified as the preferred scenario — a scenario that embodies the towns' vision and principles for future growth.

FIGURE 1.
PROJECT
PROCESS
TIMELINE

This figure illustrates the project process, including major milestones, engagement events, and workshops.



Project Process

The Towns of Turner Valley and Black Diamond approached this project with a long history of collaboration and partnership. Through mutual interests and shared benefits, the Towns aim to define a shared vision for the long-term growth of Turner Valley and Black Diamond, and in doing so inform the joint review of the Towns' MDPs.

The development of a shared and inclusive vision for the Joint Growth Strategy, evolved through work with the two Town Councils, the Committee, and the public. Refer to Figure 1. Project Process Timeline for an overview of the project process.

Engagement with the public and the Committee throughout the project process was informed by a set of Planning Principles that were identified at the beginning of the project to ensure a successful process. These principles are based on best practices and standards in the planning field. Throughout the project process, the Joint Growth Strategy upheld the following Planning Principles to be a process that was:

- » **Comprehensive.** All significant options and impacts are explored.
- » **Efficient.** The process should not waste time or money.
- » **Logical.** Each step leads to the next.
- » **Balanced.** Outcomes consider fiscal and environmental sustainability.
- » **Resilient.** Diversified land base for changing demographics and economies.
- » **Integrated.** Short-term decisions support strategic, long-term goals.
- » **Inclusive.** People affected by the plan have opportunities to be involved.
- » **Transparent.** Everyone involved understands how the process operates.
- » **Informative.** Results are understood by affected stakeholders.

The public provided input largely in the beginning of the project, through two Community Visioning Workshops, both held on July 14, 2015. Roughly 70 people attended these workshops, which were designed to: (1) understand valued community places and characteristics, (2) identify areas of concern and opportunities for improvement, and (3) develop shared growth goals, principles, and vision. As a result, several key ideas arose from the workshops. For the 30-year vision of the towns, workshop participants want to see Turner Valley and Black Diamond become:

- » A thriving, self-sustained community.
- » A community with a small town feel, close-knit neighbours, and an active cultural scene.
- » A community that is a leader in innovation and sustainability.
- » A community with well-designed, diverse, and connected neighbourhoods and open spaces.
- » Two towns that become one – “Diamond Valley.”

In parallel to this engagement with the public, the Committee also provided input and feedback throughout the project, including two events: a Vision and Principles Workshop, and a Growth Scenario Review, held in July and December of 2015, respectively. Together, ideas from the public and the recommendations from the Joint Advisory Committee were the basis for the development of the Joint Growth Strategy's Vision and Principles, and informed the development of the growth scenarios, as well as the recommendation of the preferred scenario.

Vision + Principles

The Vision and Principles were developed based on input received during the community visioning session and the first Joint Advisory Committee Meeting held on July 21, 2015.

Vision

In 2075, Black Diamond and Turner Valley are innovative, self-sustained and inclusive communities with strong western roots and a long history of partnership and cooperation. Nestled in the foothills of the Rocky Mountains, the Towns are joined by the Sheep River Valley and the Cowboy Trail, providing a range of opportunities for residents and visitors alike to access and enjoy the area's many amenities, open spaces, views and natural landscapes. Together, the Towns provide a high quality of life for all residents, supported by an active and close-knit community; a thriving and diverse local economy; healthy and connected ecosystems; and efficient infrastructure that enables sustainable growth and development well into the future.

Principles

Jurisdictional Neutrality. The development of the Joint Growth Strategy is a cooperative effort intended to serve both the Town of Black Diamond and the Town of Turner Valley. To accommodate future population and employment growth within the most suitable areas, the planning process assumes jurisdictional neutrality and assesses the entire study area. Additionally, any intent of individual landowners to develop their property is not considered in the allocation of future growth.

Equity + Inclusivity. The development and implementation of the Joint Growth Strategy is based upon a long history of partnership and cooperation. The planning process is committed to ensuring that future costs and benefits are equitably distributed between the Town of Black Diamond and Town of Turner Valley. The process is transparent and works to build consensus-based solutions that respect the needs and perspectives of all stakeholders.

Efficiency. The Joint Growth Strategy aims to increase servicing efficiency and reduce the cost of accommodating future growth. To achieve efficiency, the planning process identifies servicing overlaps, integrates opportunities for shared infrastructure and establishes a strategy for the prioritization of future growth areas.

Sustainability. A sustainable approach to planning considers economic, social, and environmental implications in an integrated and responsible manner. The Joint Growth Strategy will support economic vitality and complete communities, and will ensure the needs of the present are met while preserving the welfare of future generations. Environmentally significant areas and natural ecological resources will be maintained and conserved.

Flexibility + Resilience. The long-term success of both Black Diamond and Turner Valley depends on their ability to evolve and adapt to changing realities. The Joint Growth Strategy incorporates flexible scenarios that respond to both local and regional growth factors.

Local Knowledge. The Joint Growth Strategy is developed in consultation with both communities, with input from municipal staff, key stakeholders and local residents integrated at each stage of the planning process.

Report Approach and Content

The growth of cities and towns is affected by a variety of factors, including municipal, regional, and provincial policies; land tenure; infrastructure; housing preferences; changing land demands; and physical and fiscal limitations. To ensure an integrated and coordinated planning approach between the Towns and within a regional context, a consistent evaluation framework was used throughout the land assessment and scenario development processes, guaranteeing that all planning challenges were addressed.

To illustrate the process and highlight the growth scenarios, the Joint Growth Strategy is comprised of the following content:

» **Local Context** provides an overview of:

- a. The Towns' **policy framework**, which includes existing policy documents and plans, for both the local and regional context.
- b. A **land supply assessment** that provides an analysis of the available land supplies within the Study Area in order to determine key opportunities and constraints. In this assessment, areas are identified that (a) are vulnerable and warrant preservation and protection, and (b) are most suitable for future development, i.e. free from physical and regulatory constraints.
- c. A brief glance at the **infrastructure capacity** in the Study Area, including transportation, potable water, stormwater, and wastewater, as well as the methodology and assumptions for the assessment of development impacts on these infrastructure servicing systems.

» **Projected Land Needs** is a summary of projected land requirements to support population growth over 30- and 60-year planning horizons. Subsequently, this section also includes the impacts of future population growth on residential, commercial, and industrial land demand.

- » **Scenarios for Growth** provides an overview of the three scenarios of growth: Scenario 1: Two Towns Grow Together, Scenario 2: Two Towns Grow Apart, and Scenario 3: Joint Advisory Committee Direction. In this section, the overall scenario concept (land uses and land area), as well as infrastructure needs and costs, are included for each scenario and compared among all three.
- » The document concludes with **Considerations for Future Growth Planning**, including a general phasing for the growth based on servicing and land use considerations.
- » Additionally, **four appendices** are included to provide more detail on the Joint Growth Strategy results, including the land demand projection analysis and infrastructure assessments for all three scenarios.



Context

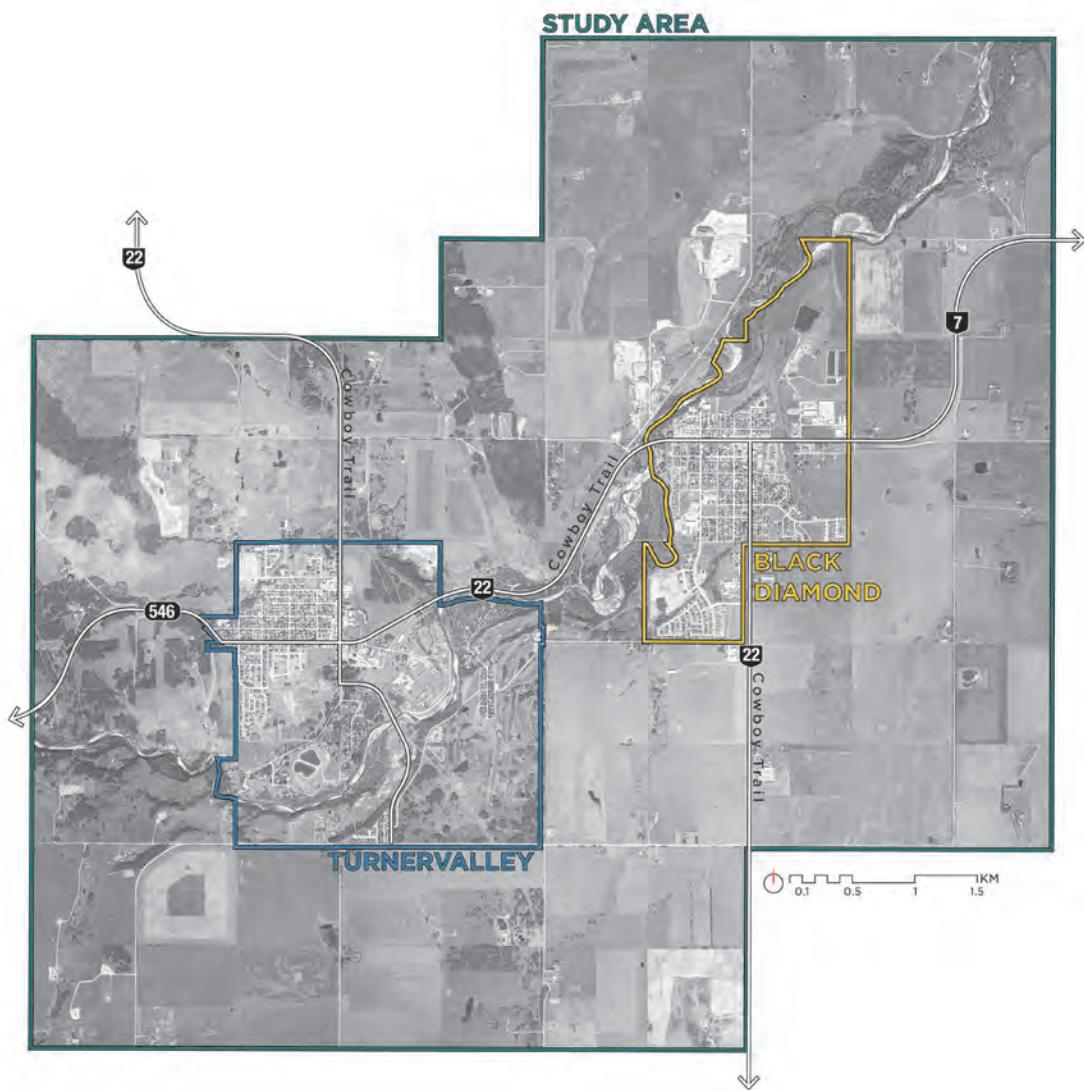
Context

Located in southern Alberta, within the MD of Foothills, the Town of Turner Valley and the Town of Black Diamond are approximately half a mile apart, both located along the Sheep River. The Study Area for the Joint Growth Strategy includes the two towns and roughly 65.5 adjacent quarter sections of land within the MD of Foothills. The location of the two towns within the region is illustrated in Figure 2. Growth Study Area.

Named after the first settlers in the area, Turner Valley was incorporated as a town in 1930. Further down the Sheep River, the Town of Black Diamond was named after the nearby high grade yielding coal mine. In 1914, a discovery of the first major natural gas and oil field in Alberta sparked the development of both towns through the mid-1940s, until the field was depleted and the industry shifted further north in Alberta. Today, both are small, thriving towns within Calgary's urban fringe that capitalize on recreation-oriented activities and tourism along the Cowboy Trail – the 700km north-south route along Highway 22.

**FIGURE 2.
GROWTH
STUDY AREA**

This map illustrates the boundaries of both towns, as well as the defined study area for the development of the growth strategy.



Policy Framework

In Alberta, planning policy and enabling legislation provide for a system where responsibilities for current and long-term planning are shared between the provincial and municipal governments. Broad goals and objectives, and legal requirements for land uses and associated plans are established at the provincial level, while municipal governments are responsible for adopting detailed land use policies through Municipal Development Plans (MDPs), Area Structure Plans (ASPs), Land-Use Bylaws, and other documents. Additionally, regional agreements – largely the Calgary Regional Partnership – have an influence on planning decisions in the two towns.

Provincial Land Use Policy and Planning

At the provincial level, two documents are the most pertinent to local planning for Turner Valley and Black Diamond: the *Municipal Government Act* and the *South Saskatchewan Regional Plan*. However, there are a number of other laws and regulations that also impact local planning, including the *Public Lands Act*, the *Subdivision and Development Regulation*, and the *Environmental Protection and Enhancement Act*, among others.

Municipal Government Act (MGA)

The *Municipal Government Act* (MGA) is the primary legislative document for enabling municipal authority and municipalities' formal operating procedures, including a detailed framework for land use decision-making at the local level. Part 17 (Planning and Development) of the MGA outlines components of land use management at the municipal level, including:

- » Planning authorities;
- » Development plans;
- » Land use bylaws;
- » Development levies and conditions;
- » Land subdivision and conditions for approvals;

- » Reserve lands (environmental, municipal, and school); and
- » Appeals processes.

The MGA also establishes statutory development plans as tools for providing local land use and development decision-making. Statutory plans recognized under the MGA include the following:

- » **Intermunicipal Development Plans (IDPs)** are agreements between two or more municipalities, primarily in place to manage fringe areas on boundaries of urban and rural municipalities, and/or to manage natural features shared between multiple jurisdictions.
- » **Municipal Development Plans (MDPs)** are required by the MGA for all municipalities with a population of 3,500 or more, and act as the primary policy document for establishing municipal land use policies.
- » **Area Structure Plans (ASPs)** establish, for new growth / development, the general land use, transportation, and servicing elements of areas within a municipality.
- » **Area Redevelopment Plans (ARPs)** provide guidance on planning policies for areas within a municipality where there is already existing development, and redevelopment is already occurring or is likely to occur.

These statutory plans must address all required components specified in Division 4, Part 17 of the MGA, regarding the content, notification and public consultation processes, and consistency with other statutory plans.

The Alberta Land Stewardship Act and the South Saskatchewan Regional Plan

The *Alberta Land Use Framework* (the Framework) was adopted in 2008, under the *Alberta Land Stewardship Act* (ALSA), as a new approach to manage land and natural resources in the province. The Framework's primary purpose is to achieve key, long-term economic, environmental, and social goals. In accordance with the ALSA, and as part of the Provincial goal to develop seven regional plans for the

province, the *South Saskatchewan Regional Plan* (SSRP) was completed and approved in 2014. As part of the SSRP plan area, the Towns of Turner Valley and Black Diamond must consider and be consistent with SSRP goals and policies when making planning and development decisions. The SSRP and the ALSA have the following implications for the planning and growth of the two towns:

- » **Regional plans are binding on local governments**, and all statutory plans must conform to the policies outlined in corresponding regional plans, as well as any sub-regional or issue-specific plans developed under these regional plans.
- » **Conservation easements** may be granted to local governments by landowners under the ALSA for the protection, conservation, and enhancement of the environment, aesthetic values, or agriculture.
- » **Conservation directives** may be imposed by the Province as part of a regional plan to “protect, conserve, manage, and enhance environmental, natural scenic, aesthetic, or agricultural values” by restricting the use of the land. However, landowners may be eligible for compensation for any subsequent reductions in property value.
- » Regional Plans may also include provisions for **conservation off-sets**, where the adverse effects of activities, such as development, may be required to be balanced by approved improvements in a “conservation area.” These improvements can be used to assign “stewardship units” to a landowner, which may be traded on an exchange established by the Province.
- » The conservation off-set system also allows for the creation, by local authorities, of **transfer of development credits programs**.



Gross residential acre is the acreage of land available for residential development including allowances for roads, municipal reserves, stormwater management, and community services, but excluding non-developable areas (environmental reserve, expressways, railways and lands unsuitable for development) and regional land uses.

Calgary Regional Partnership

Established in 1999 to facilitate sustainable growth and coordinated development in the Calgary region, the Calgary Regional Partnership (CRP) is a voluntary regional organization of 13 municipalities. Program areas for the CRP include regional initiatives in watershed protection, regional transit and transportation, economic development, land use planning, and regional infrastructure, among others. The *Calgary Metropolitan Plan* (CMP) is the main effort by the CRP to coordinate regional land use planning and other initiatives among member municipalities. As members of the CRP, the Towns of Turner Valley and Black Diamond agree to align their planning and policy development with the goals and policies of the CMP. For the purposes of coordinating long-term growth, there are several specific policy statements in the CMP that have direct impact on the development of the Joint Growth Strategy, including the following:

- » **Priority Growth Areas.** The CMP identified specific areas as “Priority Growth Areas” to accommodate future, sustainable growth at urban levels of density. The Priority Growth Areas include some areas within the current boundaries of Turner Valley and Black Diamond.
- » **Density and intensification requirements.** Member municipalities should work to achieve residential densities of 8 to 10 units per gross residential acre, with at least 25% of new growth accommodated by redevelopment of existing areas. Turner Valley and Black Diamond do not have a history of intensification, but have rather focused on maintaining their small town atmospheres. Therefore this intensification target will not be included as a factor in determining the amount of residential land needed for future growth. However, the Towns will seek to meet the minimum density target over the next several decades.
- » **Development form and location.** New development in Priority Growth Areas should be compact, mixed-use, walkable activity centres, and residential development should be located near local and regional transit.

Local Land Use Policy and Planning

The planning documents relevant to the development of the Joint Growth Strategy are limited, and include just a handful of land use policy and planning documents. Despite their close proximity, the two Towns both operate and function as independent, distinct communities, with their own set of goals and planning documents. However, planning coordination between the two Towns, as well as the MD of Foothills, is achieved through the Intermunicipal Development Plan (IDP). Additionally, this Joint Growth Strategy is also an effort on the part of the Towns to coordinate their planning efforts and maintain a symbiotic relationship between the two towns. Relevant plans and their pertinence to the Joint Growth Strategy are outlined in the following pages.

Municipal Development Plans

Municipal Development Plans (MDPs) are the primary planning documents for municipalities, providing overarching goals for the community, as well as land use planning policies and strategies for future development. While these MDP goals, planning policies, and strategies influenced the development of the Joint Growth Strategy, the subsequent update of these MDPs through a joint planning process, in turn, respond to and help carry forward the Joint Growth Strategy. The two relevant existing MDPs include:

- » The *Town of Turner Valley Municipal Development Plan* was approved in 2004 with five planning values in mind: community aesthetics, small town atmosphere, appreciation for heritage, environmental stewardship, and governance.
- » The *Town of Black Diamond Municipal Development Plan* was approved in 2001 and is centred around four similar planning values, including positive small town atmosphere, respect for the environment, heritage appreciation, and healthy economic growth.

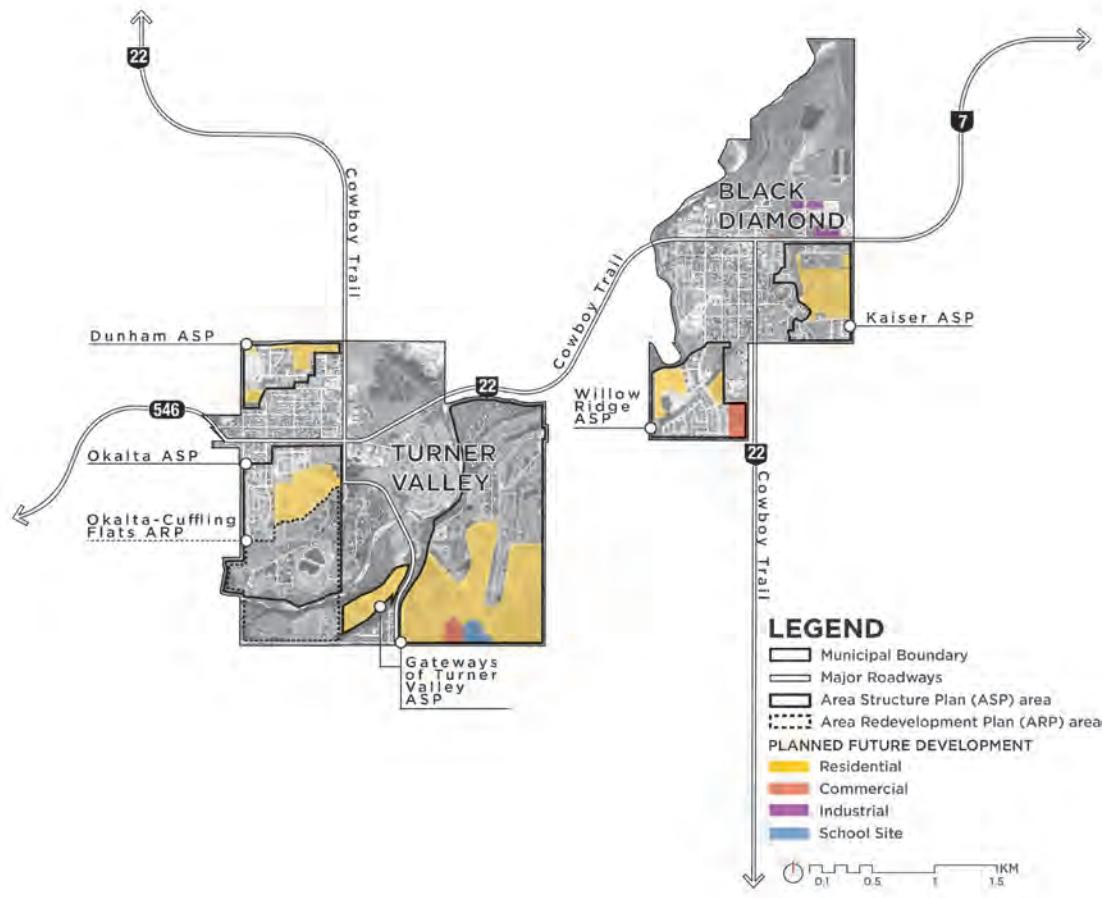
Area Structure/Redevelopment Plans

Within Turner Valley and Black Diamond, there are four pertinent Area Structure Plans (ASPs) and one Area Redevelopment Plan (ARP) (refer to Figure 3. Current Planned Growth for the Two Towns) that helped inform future land use needs and the Joint Growth Strategy. These relevant plans are as follows:

- » The *Dunham Area Structure Plan* (1999), a plan for the northwest corner of Turner Valley that is only partially built out, and is comprised primarily of future residential.
- » The *Gateways of Turner Valley Area Structure Plan* (2007) is a large portion of the southeast of Turner Valley, adjacent to the Turner Valley Golf Club, that has yet to be developed. The ASP is comprised primarily of proposed residential development, but also contains future commercial and institutional (school) uses.
- » The *Okalta Area Structure Plan* (1995) is a partially undeveloped plan for a large area on the western side of Turner Valley just north of the Sheep River. Proposed future development within this ASP is residential uses.
- » Within the same area, the draft *Okalta-Cuffling Flats Area Redevelopment Plan* (2015) is a revised plan for the southern, undeveloped portion of the Okalta ASP and the area of land across the Sheep River adjacent to the southern town boundary. The concept for this ARP is a mix of residential densities, with proposed environmental reserve and municipal reserve land, as well as proposed public utility land to accommodate the raw water reservoir.
- » The *Kaiser Area Structure Plan* (pending – 2016) is an ASP in-progress for an area of land on the eastern boundary of Black Diamond.
- » The *Willow Ridge Area Structure Plan* is largely built out, with the exception of an 11 acre commercial parcel on Highway 22.

**FIGURE 3.
CURRENT
PLANNED
GROWTH FOR
THE TWO
TOWNS**

This map illustrates existing ASPs and planned development for the two towns. These future land uses were used to guide the development of the growth strategy.



Intermunicipal Development Plan

The *MD of Foothills / Town of Black Diamond / Town of Turner Valley Intermunicipal Development Plan* was adopted in 2002 by the three partnering municipalities. For the purposes of the Joint Growth Strategy, the IDP provides insight as to the current level of coordination, any potential areas of conflict (as well as areas of future growth), and the collective vision for the border areas of the three municipalities. The IDP has ten identified planning goals, which are as follows:

1. To provide an intermunicipal policy framework to guide future land uses decisions within the plan boundaries which will take into consideration issues such as incompatible uses and manner of proposals for future development (see section 631(2)(a) of the Municipal Government Act).
2. To address requirements of the Municipal Government Act with respect to Intermunicipal conflict resolution procedures, plan administration and plan amendment or repeal procedures (refer to section 631(2)(b) of the Act).
3. To resolve issues related to circulation and referral procedures, including equality of municipal status with respect to referrals, degree of intervention and dispute resolution procedures.
4. To establish principles whereby all municipalities may consistently apply planning policies and land use bylaws within their respective jurisdictions.
5. To protect future servicing and transportation corridors and infrastructure facilities (e.g. Town of Turner Valley and Town of Black Diamond water supplies, the Westend Regional Sewage Services Commission sewage lagoon, utility right-of-ways, Hwy 22, Hwy 7 and SR 546) in the municipalities.

6. To establish principles addressing existing and dominant land uses in the plan area (e.g. Lilyfer Poultry (Black Diamond) Ltd., Sheep Creek Pit, Chase Hoffman Pit, Regional Commission Industrial Lands).
7. To recognize the historical designation of the Turner Valley Gas Plant.
8. To establish principles guiding future uses and development in the Sheep River watershed.
9. To address the relationship of the Intermunicipal Development Plan to any future annexation.
10. To address any significant issues that may be identified through the public participation process.

Along with a review and update of the town's MDPs, an important next step in the implementation of the Joint Growth Strategy will be the review and update of the IDP.

Land Supply Assessment

Identifying the most appropriate lands to support additional growth is necessary, given the gross land requirements to support projected growth over the next 30 and 60 years. To guide recommendations for growth, land in the study area was evaluated for residential, industrial, and commercial uses according to two primary strategies of spatial analysis:

- » The **Defensive Strategy** illustrates vulnerable areas that warrant preservation and protection. This analysis highlights areas with key ecological or landscape functions, or where development would require significant modification of the natural landscape to be feasible.
- » The **Offensive Strategy** focuses on development hazards or constraints, and areas most suitable for future development and growth. This analysis highlights characteristics that would make the siting of development in an area more or less desirable, with different impacts dependent on the land use: residential, commercial, and industrial.

DEFENSIVE STRATEGY

WATERWAYS + WATERBODIES

WETLANDS

VEGETATED AREAS

STEEP SLOPES

HISTORICAL RESOURCE AREAS

OFFENSIVE STRATEGY

FLOOD HAZARD AREAS

STEEP SLOPES

POTENTIALLY CONTAMINATED SITES

ENERGY INFRASTRUCTURE

SERVICING INFRASTRUCTURE

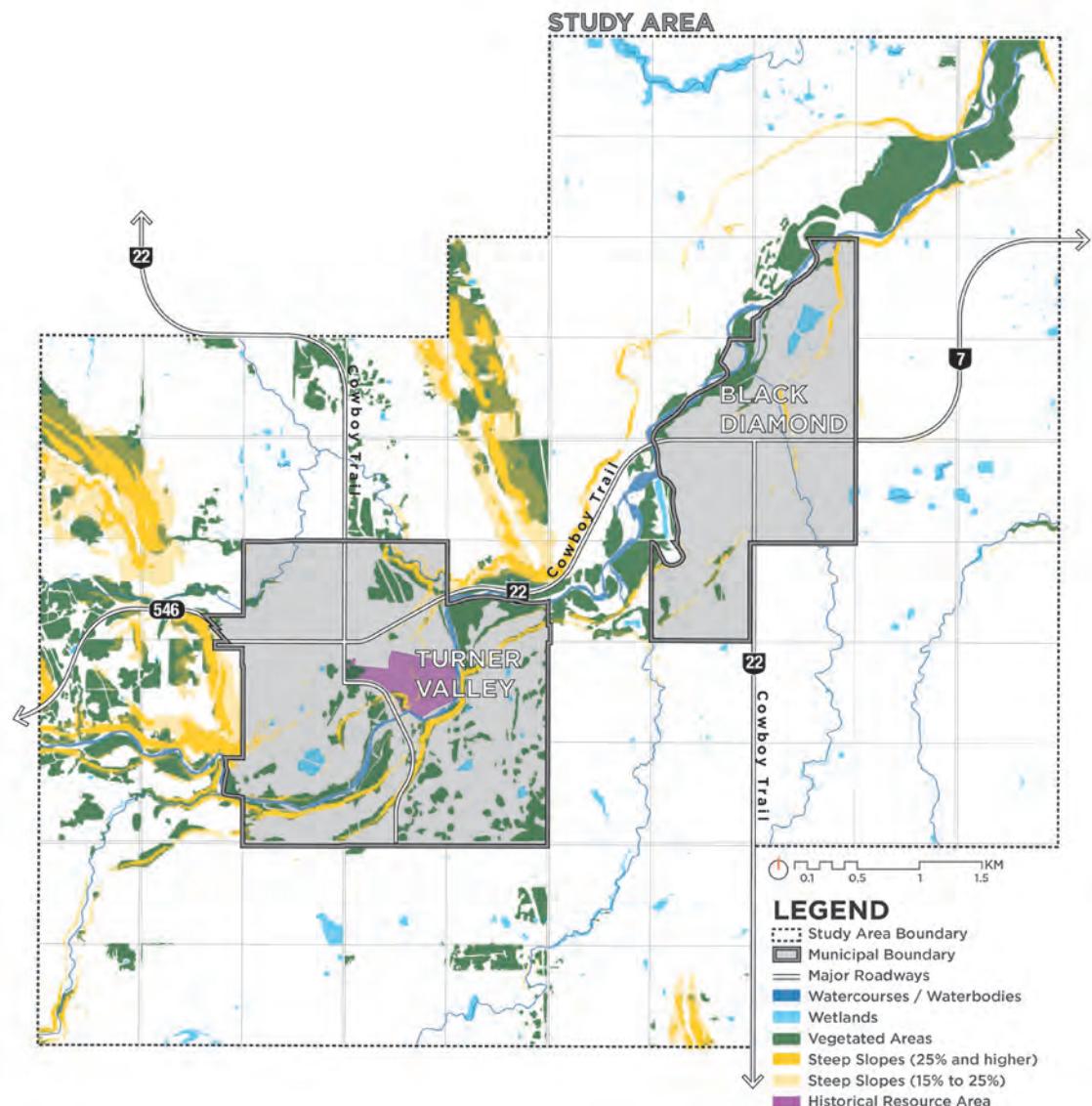
Defensive Strategy

The Defensive Strategy highlights environmentally vulnerable areas and environmental constraints to future development through the spatial analysis of five key factors (refer to Figure 4. Defensive Strategy). These five factors are areas that need to be protected from development, and include:

1. **Waterways and Waterbodies.** This data was provided by the Towns, and consists of the Sheep River and several small tributaries, as well as a MGA-enabled, 6 metre riparian setback from all the watercourses. While 6 metres is the minimum that the Towns can claim as Environmental Reserve, the Towns should also consider the widely used 50 metre setback in planning and designing development adjacent to waterways and waterbodies. Riparian areas, at the interface of land and a waterway, provide critical habitat for plant and wildlife communities. Protecting waterways and their riparian areas is crucial to ensuring buffers from excessive silt and surface run-off pollution, aiding in waterway bank stabilization, providing food, nutrient, and organic matter to the waterway, allowing areas for waterway channel migration, and helping to ensure the overall ecological health and productivity of the waterways.

FIGURE 4. DEFENSIVE STRATEGY

The defensive strategy consists of a spatially analysis of important environmental, historical, and culturally significant factors. This map highlights these areas that should be protected from development, or require specific development considerations.



2. Wetlands. Wetlands within the study area were identified (and digitized) based on multiple sets of imagery (in order to account for different seasons and data years). Wetlands are important to include within the defensive strategy as the preservation and management of wetlands is crucial for maintaining watershed health, environmentally significant habitats, and wildlife connectivity. Wetlands act as development constraints, with *Alberta's Wetland Policy* regulating how wetlands are managed in the province to minimize loss and degradation of wetlands, while allowing for continued growth and economic development. Additionally, as critical habitats for wildlife (especially birds), legislation around species-at-risk and migratory birds further protect wetlands.

3. Vegetated Areas. Vegetated areas include forested areas, shrubland, and forested riparian areas, all of which were identified (and digitized) in the same process as wetlands, using multiple sets of imagery. Vegetated areas provide wildlife habitat and connectivity, and help mitigate a series of side effects of development, including run-off, slope/soil erosion, air pollution, etc.

4. Steep Slopes. Slopes of 15% or more were highlighted due to their higher risk of erosion and instability. These areas are incorporated in the defensive strategy to protect environmentally at-risk areas from development.

5. Historical Resource Areas. There is only one historical resource area within the study area, the Turner Valley Gas Plant. A National and Provincial Historic Site, the Turner Valley Gas Plant began with the first drilling onsite in 1913 (oil was struck in 1914). The site was acquired by Alberta Culture in 1988 and designated a Provincial Historic Resource in 1989 and a National Historic Site in 1995 on the basis that the plant, equipment, and processes are of provincial, national, and international significance to the history of industrial technology.

Offensive Strategy

The Offensive Strategy illustrates constraints and hazards that make development more or less desirable through the spatial analysis of five key factors (refer to Figure 5. Offensive Strategy). These five key factors limit or prohibit development, and include:

1. Flood Hazard Areas. Since the 1970s, the Province of Alberta has produced (and updated) flood hazard studies and mapping to delineate flood hazard areas along streams and lakes. The last review and update of flooding hazards in the Study Area was completed in 1992, and illustrates areas within three main zones to be protected (to various degrees) from new development:

- Floodway – the portion of flood hazard area where flows are the deepest, fastest, and most destructive. Typically includes the main channel of a waterway and a portion of the adjacent overbank area.
- Flood Fringe – the portion of flood hazard area outside of the floodway, where water is generally shallower and flows more slowly than in the floodway.
- Overland Flow – Areas within the flood hazard area, but outside of the floodway and may include special areas of the flood fringe.

As demonstrated during the 2013 flood, development within floodways and flood fringe areas is not recommended; even development within some areas of overland flow put development at risk of flooding. Therefore, these areas

act as a development constraint, and cannot be recommended as areas for future development. While development is still permitted within flood fringe and overland flow areas (with some stipulations), under provincial legislation, new development in floodways is prohibited.

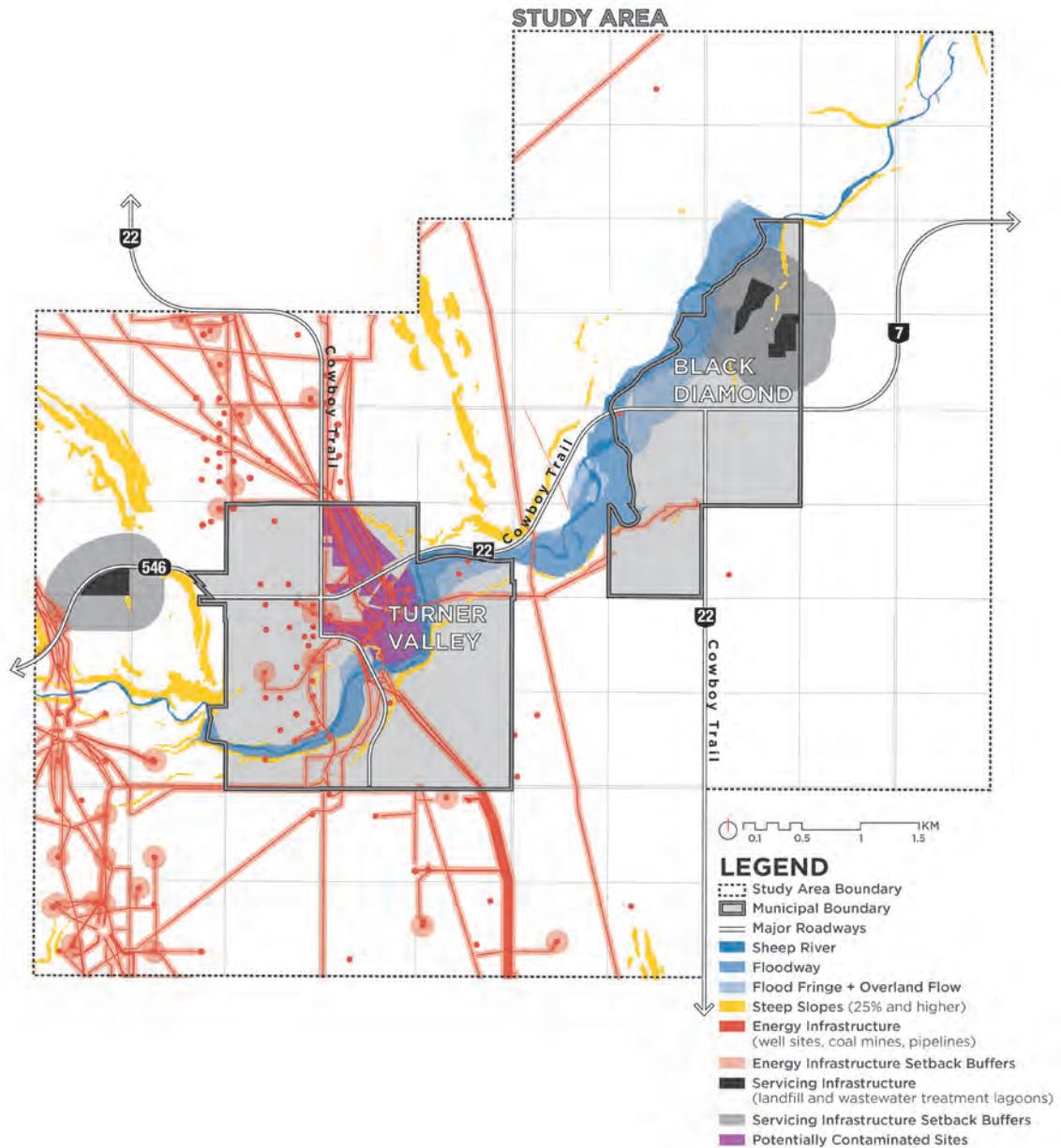
2. Steep Slopes. Steep slopes, those 25% or greater, are considered development constraints, as development on these slopes is costly and highly infeasible. While some uses are more feasible on steep slopes than others (residential is more acceptable on a steeper slope than commercial and industrial, because it is a less intensive use), building on these slopes is typically too costly (due to design and construction fees, as well as servicing) to warrant development.

3. Potentially Contaminated Area. Potentially contaminated areas (i.e. brownfields) are sites that are either likely or confirmed to have ground contaminants, typically due to a prior industrial use on the site, such as heavy manufacturing or processing plants. These types of areas create constraints for development because they require remediation or reclamation prior to new development to ensure not only the health of residents or workers, but the environmental health of the area. Remediation or reclamation projects can be costly and take several decades to complete, so development of these areas is often not considered cost-effective, or may take too much time and planning. The one identified, potentially contaminated area is the identified Turner Valley Gas Plant and an area to the north, where additional operations previously took place.

4. Energy Infrastructure. Energy infrastructure includes coal mines, pipelines, well sites, and other oil and gas facilities. Data received from Alberta Energy Regulator depicts a number of active and inactive operations throughout the area, primarily in and around Turner Valley. In line with provincial and federal policy, active well sites are given a 100 metre setback buffer and abandoned wells are given a 5 metre setback buffer, while safety zones for active and inactive pipelines require a 30 metre setback buffer. As a safety measure, development within these setback areas is prohibited.

FIGURE 5. OFFENSIVE STRATEGY

The offensive strategy consists of a spatial analysis of constraints, as well as hazards that make development more or less desirable. This map highlights areas with development limitations due to policies and regulations, as well as environmental constraints, such as flood plains and steep slopes.

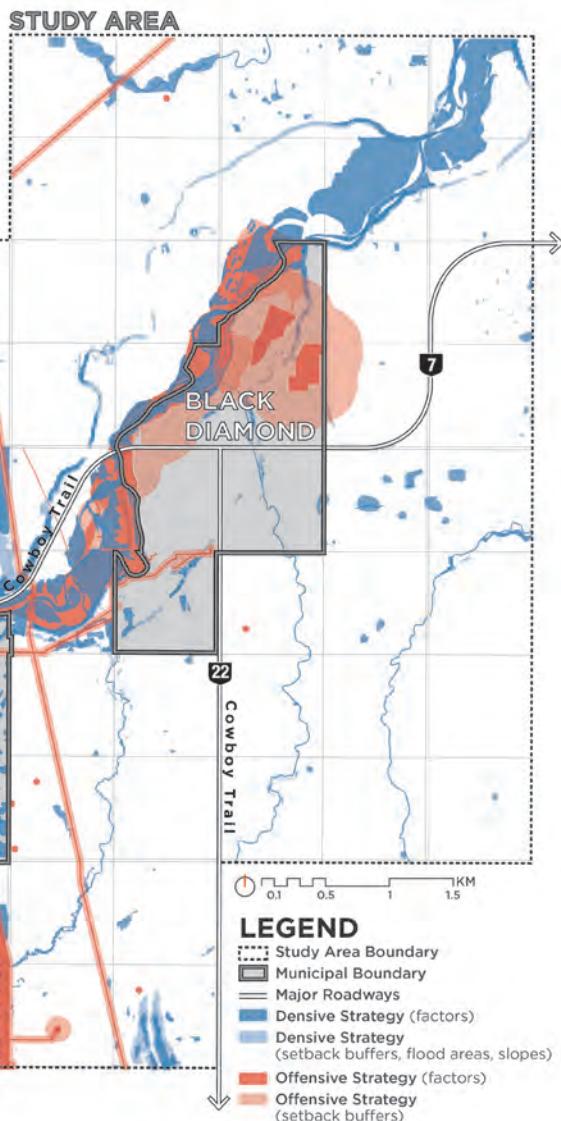


5. Servicing Infrastructure. There are two main land uses within the study area that act as development constraints: a non-operating landfill with a required 300 metre setback buffer and wastewater treatment lagoons with required 300 metre setbacks buffers. Within these setback areas, development is prohibited due to a variety of reasons, including health and safety concerns, as well as both activities being considered noxious uses.

Conclusions

The illustration of the two strategies combined highlights the overlaps in areas of environmental vulnerability and physical constraints to future development (refer to Figure 6. Land Supply Assessment). Consequently, several key conclusions can be drawn to inform development within potential growth areas:

- » Areas close to the Sheep River are highly sensitive for a variety of reasons (including environmental hazard and legally required setback buffers), and should be avoided for development when possible. It is recommended that the bulk of this area surrounding the Sheep River be designated as park and



**FIGURE 6.
LAND SUPPLY
ASSESSMENT**

Merging the results of the defensive and offensive strategies, this map demonstrates areas with the most development potential, i.e. unfragmented, unconstrained quarter sections.

open space to minimize environmental risks, such as flooding and slope erosion, and meet pipeline setback requirements.

- » Areas to the north and west of Turner Valley are much more heavily constrained than areas to the south and east of the town. It is recommended that these areas to the north and west of Turner Valley largely remain rural, as the limited land available for development in these areas is significantly fragmented.
- » With large areas of unconstrained land there is significant development potential south and southeast of Black Diamond, and to the east of Turner Valley.
- » The feedback during public engagement supports the defensive strategy: residents value and wish to protect the river and waterways; the open, natural environment; and the towns not only as a gateway to Kananaskis, but as a part of the foothills landscape. These defensive strategy factors are also consistent with the Joint Growth Strategy's Vision and Principles, and are inherent to the towns' sense of place and identity.

Existing Infrastructure Capacity

Servicing needs for each scenario (see Part 4) were completed based on existing infrastructure capacity and several baseline assumptions for additional population demand and land development. The following section explores both the existing infrastructure in the study area, as well as the general methodology of analysis of the four infrastructure systems – transportation, potable water, stormwater, and wastewater – that will be significantly impacted by future growth.

Transportation

Context

Three main roads make up both the regional and local road network for Turner Valley and Black Diamond: Highway 22, Highway 7, and Highway 546. Highways 22 and 7 function as both local arterials for the two towns but also connector roads to the region: these two highways both support most of the towns' local commercial services and serve as their "main streets." Highway 546, while also a major arterial for Turner Valley, is mainly considered the gateway road to the Sheep River Valley, providing access to Sheep River Provincial Park. As Highway 546 does not receive a regular amount of heavy road traffic (as it is not a through road, though it does act as an excellent

bicycle route), this roadway was not a focus of the transportation analysis. The towns' growth would most heavily impact Highways 22 and 7, the two-lane roadways, with two highways class corridors.

Highway 22 (also known as the Cowboy Trail) is a significant north-south link for the two towns, stretching from Mayerthorpe to the north and Pincher Creek in south, but it is also the primary connection between Black Diamond and Turner Valley. Whereas Highway 22 is a two lane corridor adjacent to residential, agricultural, and commercial land uses, the majority of Highway 7 is limited to acreage developments and businesses. Highway 7 provides an east-west connection, originating in Black Diamond and ultimately connecting to Highway 2. Due to the two highways' heavy use as scenic, regional connections, additional growth of the towns would greatly influence traffic patterns and the capacity of these two highways.

Analysis Methodology

Future traffic volume is the most significant component in determining future transportation impacts of the towns' growth. For the transportation analysis of these growth scenarios, the approximate number of single family units (based on density requirements) in the proposed residential growth areas is evaluated to determine impacts on the volume to capacity ratio (v/c ratio). The v/c ratio indicates the amount of congestion for each lane group; ratios greater than or equal to 1 indicate that the intersection is operating at or above capacity. (Alberta Transportation generally finds v/c ratios of 0.90 or less acceptable.) Necessity for upgrades to the existing road network are determined based on the functional carrying capacity and a v/c ratio greater than 0.90.

Initial traffic analysis on the existing network illustrates that additional capacity is available during the peak period. However, one study intersection in Turner Valley (Highway 546 and Highway 22) currently exceeds capacity during the afternoon peak period. Refer to Figure 7: Afternoon Intersection Level of Service for a summary

**FIGURE 7.
AFTERNOON
INTERSECTION
LEVEL OF
SERVICE**

In a traffic analysis, several key intersections were assessed to determine their current capacity and potential for growth. Only one intersection, that of Highway 22 and Highway 546, shows a serious capacity issue.

LEVEL OF SERVICE	MAJOR INTERSECTIONS	v/c
A	HWY 7 & RANGE ROAD 23 UNSIGNALIZED	0.11
	HWY 7 & 3 ST. SE/NE UNSIGNALIZED	0.14
	HWY 22 & 3 ST. SW/NW UNSIGNALIZED	0.14
	HWY 7 & 1 AVE SE UNSIGNALIZED	0.30
B	HWY 22 & HWY 7 UNSIGNALIZED	0.48
E	HWY 22 & HWY 546 UNSIGNALIZED	1.02

of intersection analysis during the afternoon period (it should be noted that not all intersections are accounted for due to data deficiencies). This initial baseline analysis illustrates that the existing transportation network has capacity to accommodate at least some additional growth.

For the transportation analysis, the following assumptions and conclusions were made for each scenario:

1. To be conservative, it was assumed that 100% of trips generated will be personal vehicle trips. However, future studies should evaluate the travel mode share within the study areas to determine a more accurate representation of how people move in the communities.
2. Carrying capacity is a function of accessibility and provides an estimate of the number of vehicles a roadway can accommodate. Functional carrying capacity for a corridor is assumed as follows: 800 vehicles per hour per lane for collector and arterial corridors, and 1,800 vehicles per hour per lane for freeway corridors.
3. Widening the Highway (Highways 7 and 22) within Black Diamond's downtown core and Turner Valley will be a significant challenge, as the surrounding areas include existing on-street parking, businesses, institutions (such as Turner Valley's library, RCMP office, and fire hall), and some homes, all of which front the road near (and within) the boundaries of the two towns.
4. Potential improvements to the network include intersection upgrades and options to either widen the existing road network to support the additional growth volumes or build new links. It was determined that widening the highways to increase the capacity would be a last resort, due to the challenges associated with widening, including the impact on existing residents, businesses, and institutions, and the removal of on-street parking.
5. To allow maximum connectivity and access, it is recommended that any proposed major roads should be modeled after the grid network.

In addition to the set of transportation assumptions and conclusions, the following points should be noted for the transportation analysis. Refer to *Appendix B: Joint Growth Strategy Transportation Conceptual Analysis* for the complete methodology and results of the transportation analysis.

- » Data for transportation analysis was made available from Alberta Transportation and the Town of Black Diamond. It is important to note that the Town of Turner Valley did not have recent data on its major roads and will require additional evaluation as proposed improvements are taken into consideration.
- » The estimated improvement costs provided in this study only account for the new road alignment and locations where traffic signals may be required; property and other impacts have not been accounted into the costing exercise.
- » This transportation analysis should only be used for comparison purposes; its use as a planning level cost estimate for budgetary or construction purposes is not appropriate. Should cost to construct or detailed cost estimates be required, a functional study or detailed design exercise should be completed as the next stage in the process. Additionally, more consideration will need to be given to determine appropriate roundabout or traffic signal treatment, as well as an additional traffic impact assessment to select the appropriate treatment to ensure that operational, safety, and property requirements are met.

Potable Water

Context

In collaboration with regional partners and the Province of Alberta, the Town of Turner Valley provides potable water to residents of both Turner Valley and Black Diamond. The two towns receive potable water from the water treatment plant in Turner Valley, which is distributed by the Sheep River Utilities regional transmission main installed in 2013 after the flood.

Analysis Methodology

Calculations for impacts on the potable water system estimated water consumption and flow rates for all land uses to determine total sanitary demands for each growth scenario. These estimates were based on typical factors in other, nearby communities, and industry standards. Future potable water servicing estimates and associated infrastructure upgrade costs were based on the following assumptions:

1. Average Daily Demand (ADD) is 315 litres/capita/day.
2. Maximum Daily Demand (MDD) is 2.2 x ADD.
3. Peak Hour Demand (PHD) is 4 x ADD.
4. Potable Water Storage Requirements include:
 - a. For Turner Valley, fire protection requires 2,000 imperial gallons (lgal) for 2 hours, so 240,000 lgal.
 - b. For Black Diamond, minimum required fire protection flow is 197 L/s (estimated from the Fire Underwriters Survey for Black Diamond (2013)).
 - c. For Turner Valley, Equalization Storage requires 25% of MDD.
 - d. For Turner Valley, Emergency Storage requires 15% of ADD.
5. The alignment of a twin line is currently assumed to follow close to the current alignment, but this will require review to confirm that adequate right-of-way exists.
6. The existing water license has not been reviewed in detail, and will likely not support the full build-out of the growth scenarios.

It is important to note that the recommendations for each scenario are not exhaustive. Moving forward to provide a conceptual design would require further detailed review of existing site conditions and a detailed development plan. Refer to *Appendix C: Joint Growth Strategy Water, Wastewater, and Stormwater Conceptual Analysis* for the complete methodology and results of the potable water analysis.

Stormwater

Context

The ultimate, main receiving body of stormwater for the two towns is the Sheep River. Currently, the two towns have a series of retention ponds and outfalls to manage stormwater release into the river through identified drainage courses. These facilities are typically designed in conjunction with new development to service a new (or expanded) catchment area.

Analysis Methodology

In all scenarios, stormwater will be managed at strategic locations by means of stormwater detention facilities (wet or dry ponds), located based on the existing ground contours. These facilities will attenuate post-development stormwater flow and release into their respective outlets (located based on existing drainage contours) at the pre-development rate. Where possible, the ponds and outlets are adjacent to receiving drainage courses that mimic natural (pre-development) drainage patterns. Additionally, it is anticipated that at some locations, ditches will have to be created to discharge stormwater into a watercourse.

Future stormwater flow estimates and associated infrastructure upgrade costs were based on several assumptions, including the following:

1. Maximum runoff storage is 550 cubic metres/hectare.
2. Maximum allowable release to the river is 6.5 litres/second/hectare.
3. Inlet and outlet costs are dependent on minor system design and tie-in conditions, as well as potential water quality treatments.
4. Landscaping costs were assumed to include some wetland plantings around the perimeter of the pond, but no park features or pathways.

5. The cost for the storm pond includes the pond and outlet piping only; no additional piping to service the catchment areas is included (as the drainage system for each catchment would be specified during the detailed design stage).

It is important to note that the recommendations for each scenario are not exhaustive. Moving forward to provide a conceptual design would require further detailed review of existing site conditions and a detailed development plan. Furthermore, catchment and pond layouts will need to be verified through a Master Drainage Plan (MDP) and a Regional Plan or Section Plan, including hydrogeological reports, geotechnical reports, and biophysical inventory and environmental assessment reports. Refer to *Appendix C: Joint Growth Strategy Water, Wastewater, and Stormwater Conceptual Analysis* for the complete methodology and results of the stormwater analysis.

Wastewater

Context

The Westend Regional Sewage Services Commission (established in 1994 by Regulation of the Government of Alberta) supplies wastewater services for Turner Valley and Black Diamond. The Westend facilities are composed of the following: the Turner Valley lift station and 180 acres of property in Black Diamond that houses the Black Diamond lift station (and equipment), the sewage lagoons, the blower building, and the transfer station.

Wastewater from both towns is treated at the Westend wastewater treatment plant in Black Diamond, sent via the Westend Sanitary Force main (re-aligned in 2013 after the flood) that has a capacity of 134 L/s. In Black Diamond, the force main transitions to a gravity main that runs north through the town to the lagoons. At the time of its installation, this gravity main was sized for future growth (with a total capacity of 280 L/s), and is used to convey additional flows when possible.

Analysis Methodology

Calculations for impacts on the wastewater system estimated future flows from all land uses (including inflow and infiltration) to determine total sanitary demands for each growth scenario. Future flow estimates and associated infrastructure upgrade costs were based on a several assumptions, including the following:

1. Average Daily Flow (ADF) is 264 litres/capita/day.
2. Maximum Daily Flow (MDF) is equal to $2.2 \times \text{ADF}$.
3. Peak Hour Flow (PHF) is equal to $5 \times \text{ADF}$.
4. The wastewater treatment costs assume that the Westend Regional Wastewater Commission lagoon system will be upgraded to a mechanical tertiary treatment plant in order to meet high quality effluent standards from the Foothills Regional Wastewater Collaborative (FRWWC) study (to be completed in early 2016). This option will require a receiving environmental study to confirm that the Sheep River has adequate capacity to receive these flows.
5. Piping within Turner Valley town boundary is not included in the cost calculations, as it is assumed that the trunk mains will be installed by the subdivision developers.
6. Piping wastewater to Okotoks or another regional plant was not reviewed as an option, but is under review in the FRWWC study.

It is important to note that the recommendations for each scenario are not exhaustive. Furthermore, moving forward to provide a conceptual design would require further detailed review of existing site conditions and a detailed development plan. Refer to *Appendix C: Joint Growth Strategy Water, Wastewater, and Stormwater Conceptual Analysis* for the complete methodology and results of the wastewater analysis.



Projected Land Needs

Projected Land Needs

Projected land needs are the necessary amount of land to accommodate and support anticipated population growth in Turner Valley and Black Diamond. Future land needs for Turner Valley and Black Diamond over the next 60 years are based on an analysis of future population growth and its impact on the demand for residential, commercial, and industrial lands. Population growth and the associated land needs were calculated over two time periods: a 30-year, short-to-medium term (2015 to 2045) forecast, and a 60-year, long-term (2045 to 2075) forecast.

Note that this section provides a summary of the methods and results of this analysis. A more comprehensive review is provided in *Appendix A: Land Demand Projection Analysis*, which presents a detailed rationale for the analytical approach, as well as calculations of land demand using alternative assumptions from those presented here.

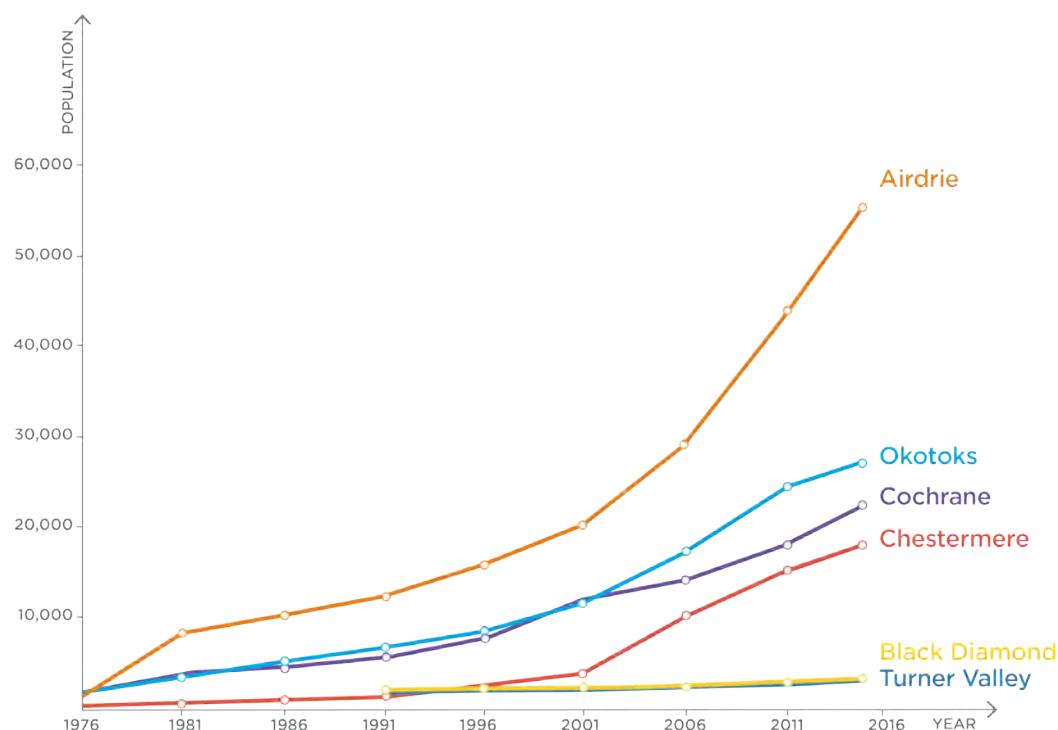
Current Trends

Within the Calgary Regional Partnership (CRP) region, several of the communities closest to Calgary – Airdrie, Cochrane, Okotoks, and Chestermere – have experienced rapid growth in recent years (refer to Figure 8. Historic Population Growth in the Region) and are expected to continue to grow. These communities just outside of Calgary are closely linked to Calgary's growth, which is illustrated in the mirroring of Calgary's significant population boom over in the last two decades in the city's neighbouring communities over the past decade.

As two towns just a little further away from Calgary, Turner Valley and Black Diamond (along with High River) are expected to experience a similar jump in population, as Calgary and the region's economy continues to grow. Furthermore, several key factors make Turner Valley and Black Diamond highly desirable places to live. These two towns are set in a natural, rural landscape with historical and unique town character; are close to both recreational opportunities and Calgary's commercial and employment resources; and are working with the Calgary Regional Partnership to establish a

**FIGURE 8.
HISTORIC
POPULATION
GROWTH IN
THE REGION**

This figure depicts population growth in Turner Valley, Black Diamond, and other regional cities over the past several decades.



commuter bus service that would provide public transit to neighbouring communities. Additionally, Highway 2A (around Okotoks) is a major industrial corridor that provides a significant employment node for the area, even more so as it continues to grow. These factors, as well as many others, such as the completion of the Calgary ring road, regional employment opportunities, and appeal as places to raise a family or retire, result in development pressures and opportunities for the two towns.

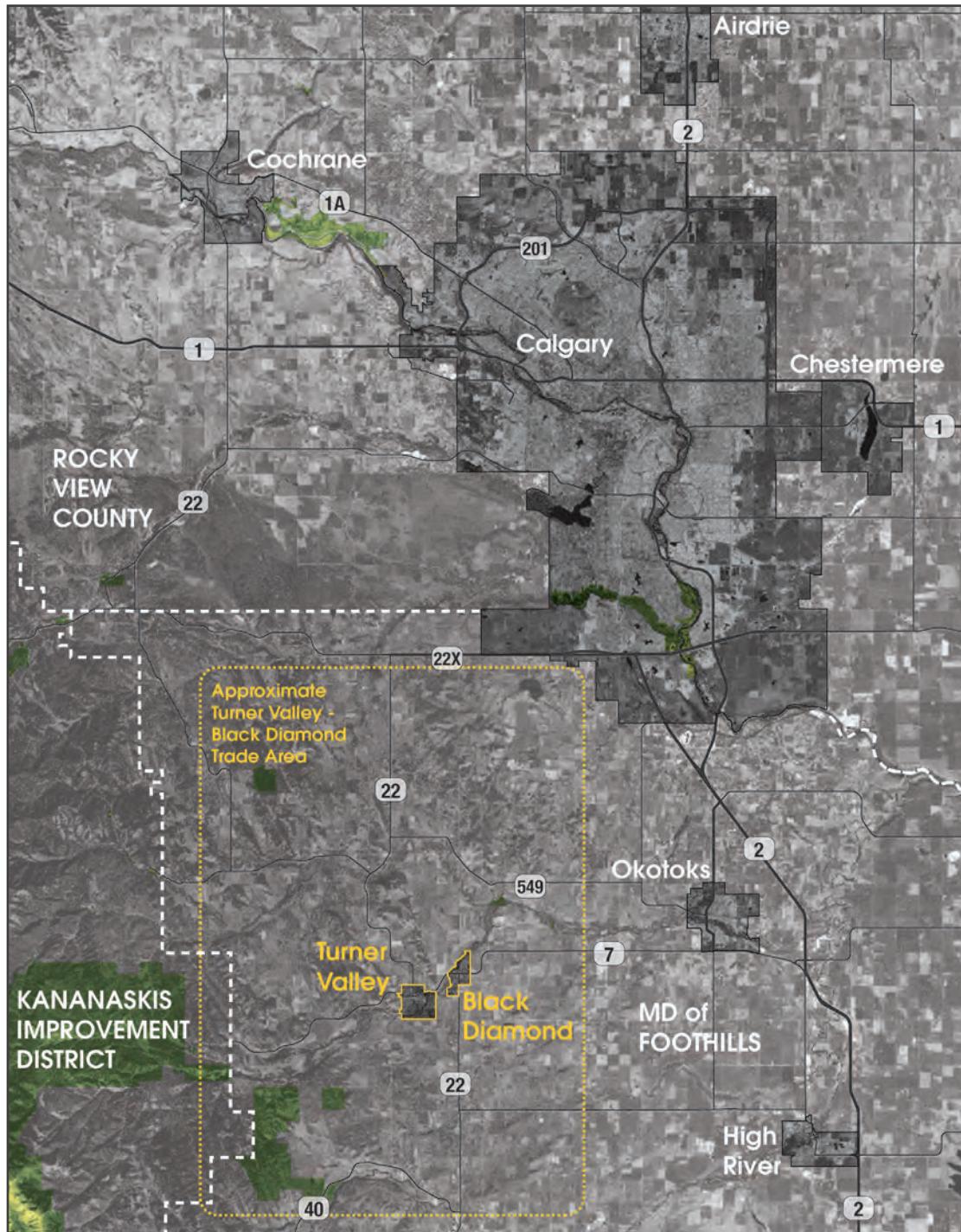


FIGURE 9.
**TURNER
VALLEY
AND BLACK
DIAMOND IN
THE REGION**

The assumed trade area for Turner Valley and Black Diamond is depicted in the map to the left. While the bulk of the population lives within Turner Valley and Black Diamond, there are almost 4,000 rural residents who are considered within Turner Valley and Black Diamond's trade area, i.e. an additional 4,000 people who would go to Turner Valley and Black Diamond to shop.

Population Forecasts

A key input in predicting future residential, commercial, and industrial growth forecasts is an estimate of the future population for the area. The 2015 populations for both towns – 2,511 in Turner Valley (according to a 2015 municipal census) and 2,577 in Black Diamond (estimated based on the most recent federal census and additional housing units from 2011 to 2015) – serve as the starting point for this 60-year population forecast.

Key Assumptions

Making use of historical and regional growth trends, as well as other forecasts, the population forecast employed several key assumptions, as described below.

1. Over the long term, available forecasts suggest a slowing rate of growth in the Calgary region. It is estimated that the overall population growth in the Calgary region will average 1.4% per year from 2015 to 2045 and 0.8% per year from 2045 to 2075 (based on Calgary Metropolitan Plan forecasts). This slowing trend was incorporated into the forecasts to assume that growth rates in Black Diamond and Turner Valley would also slow over the 60-year forecast period.
2. Two forecast trends were used for population growth in Turner Valley and Black Diamond:

- **“Lower” growth trend** that is based on the trajectory of past population growth trends in the two towns (and incorporates a slowing growth rate over the long term, as per assumption #1).
- **“Higher” growth trend** that assumes a slightly increased rate of growth in each town, compared to past trends (with a slowing growth rate over the long term, as per assumption #1). This trend was considered because it is possible that Turner Valley and Black Diamond will face increased residential growth due to a variety of factors, such as:
 - In Calgary, single-family home prices are increasing, which could shift purchasers who are interested in single-detached homes out of Calgary and into the surrounding communities, including Turner Valley and Black Diamond.
 - The planned completion of the Southwest Ring Road will improve road connections to Calgary, and will likely make commuting from Turner Valley and Black Diamond to parts of Calgary more convenient.
 - Okotoks has experienced rapid growth and urbanization over the past decade, resulting in increased densities and congestion. Buyers who are looking for a new home in a smaller town south of Calgary may increasingly consider Turner Valley and Black Diamond, rather than Okotoks.

FIGURE 10.
POPULATION FORECASTS
2015 TO 2075

This figure illustrates the low and high growth population projections for Turner Valley, Black Diamond, Turner Valley and Black Diamond (Total), and the Trade Area over the next 60-years. Refer to Appendix A for detailed tables and descriptions of these projections.

	Lower Growth Trend			Higher Growth Trend		
	2015	2045	2075	2015	2045	2075
Turner Valley	2,511	5,140	9,541	2,511	5,949	12,785
Black Diamond	2,577	5,275	9,792	2,577	6,105	13,121
Turner Valley + Black Diamond	5,088	10,415	19,333	5,088	12,053	25,906
Trade Area (Rural)	3,863	4,264	4,707	3,863	4,264	4,704
Trade Area (Total)	8,951	14,679	24,040	8,951	16,317	30,613

It is assumed that population growth in the surrounding rural parts of the commercial trade area will continue to average about 0.33% per year over the long-term, matching the recent pace of population growth in these areas. Refer to *Figure 9. Turner Valley and Black Diamond within the Region* for an illustration of the towns' trade area.

Forecast

The two forecast trends suggest that the population of Turner Valley will grow between 9,500 and 12,800 people by 2075, while Black Diamond's population is expected to reach between 9,800 and 13,100 residents by 2075. In total, the two towns are expected to reach a population of 19,300 to 25,900 over the next 60 years. Refer to *Figure 10. Population Forecasts 2015 to 2075* for a breakdown of this expected population growth. These population forecasts estimate that **the two towns will gain an additional 14,245 to 20,918 people over the 60-year time frame**. Given the accelerated growth of communities within the region, the growth scenarios were developed with the higher growth trend in mind, as the higher growth trend is most likely to occur. How this growth translates to residential, commercial, and industrial land demand is explored in the following sections.

Residential Land Demand

Projected residential land needs were calculated based on a housing demand forecast, by unit type (single-detached, semi-detached, and apartment). This forecast reflects the likely density of future residential development in the towns, and is based on population forecasts and past residential development trend indicators in Turner Valley, Black Diamond, and the Calgary metropolitan area, as well as the goal to meet the density targets of the CRP.

Land Supply

As illustrated in *Figure 3. Current Planned Growth for the Two Towns*, Turner Valley has a total of 263.9 acres of land available for urban development, of which 257.5 acres are designated for residential development. Whereas Black Diamond has approximately 84.5 acres of land available for urban development, of which 64.4 acres is designated for residential development. This available residential land can accommodate a total of 1,860 units at an average residential density of 5.85 units per gross acre in Turner Valley and 5.5 units per gross acre in Black Diamond (under the assumption that these areas will likely be developed within the next 20-30 years). As small towns with a unique sense of place, neither town has a history of intensification, so it is unexpected for the two towns to accommodate additional growth within the existing residential development through intensification.

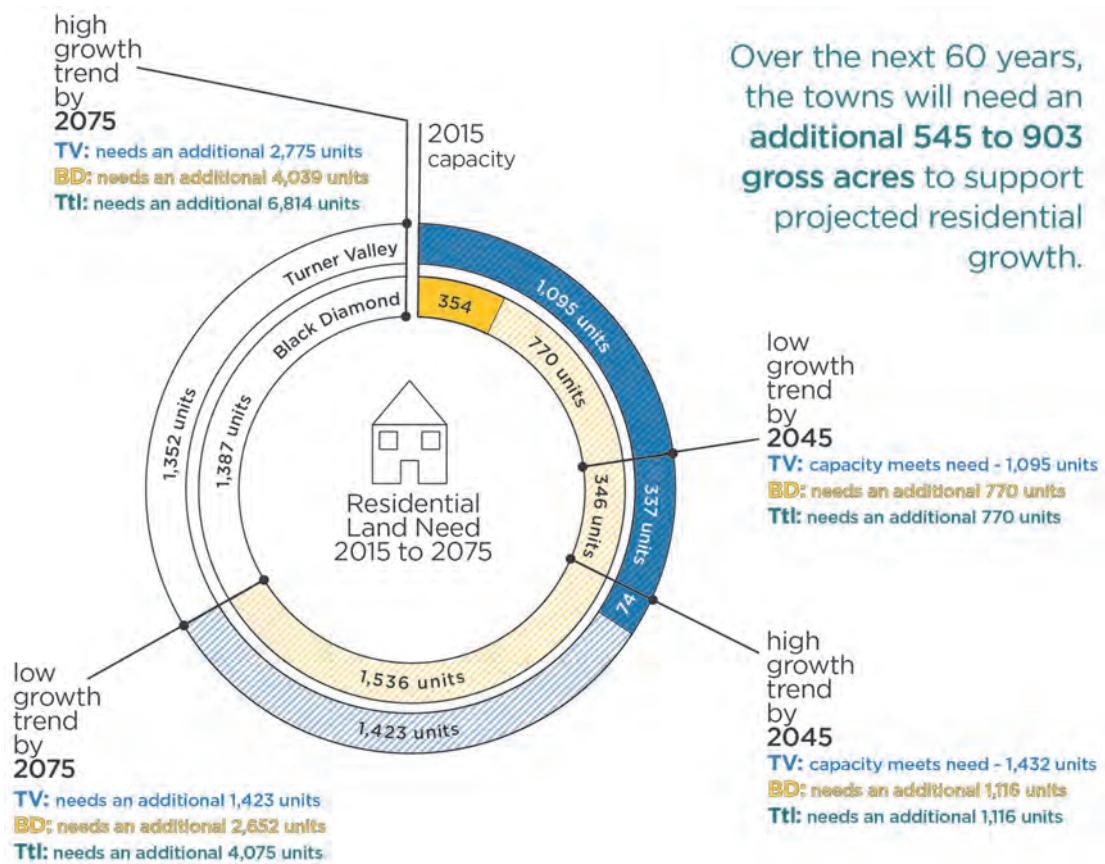


FIGURE 11.
ASSUMPTIONS
OF SHIFTS IN
RESIDENTIAL
UNIT TYPE,
2015 TO 2075

This figure illustrates the assumed shift in the proportion of the three main residential unit types in the towns: single-detached, attached, and apartment.

FIGURE 12.
RESIDENTIAL LAND NEED 2015 TO 2075

This chart depicts the two towns' existing capacity for future residential development, as well as, the towns' expected residential need based on the low and high growth trends.



Over the next 60 years, the towns will need an **additional 545 to 903 gross acres** to support projected residential growth.

Key Assumptions

Several key assumptions were made in the steps to forecast residential land demand, including the following:

1. Average household size is used (with the population growth forecasts) to generate the total estimated number of households (the first step in forecasting residential land demand). For these forecasts, an average household size of 2.4 was assumed, to match the average household size of the towns in the 2006 and 2011 federal censuses.
2. A forecast of residential unit by type is calculated based on the total growth of the number of households and an assumed housing type split. The current (from 2005 to 2014) housing type split is: 75% single-family detached, 15% semi-detached / rowhouse, and 10% apartment. Turner Valley and Black Diamond will likely continue to be suburban satellite communities in the Calgary Region over the forecast period and, while single-detached units are likely to account for a decreasing share of total housing demand over the long-term, it is assumed that single-detached
3. The amount of additional land (in terms of gross residential acres, which takes into account allowances for roads, municipal reserves, stormwater management, and community services) is based on an overall assumed residential density per acre for new development. Based on input from the towns, assumed overall average gross residential densities are:
 - 5.5 units per acre from 2015 to 2035
 - 6.5 units per acre from 2036 to 2045
 - 8.0 units per acre from 2046 to 2075

homes will remain the primary housing type. Over the 60-year time period, it is assumed that multi-family development will make up a slightly increasing share of total housing as preferences change and to help the towns meet the CRP density targets, resulting in a shift of housing types to a split of: 65% single-detached, 15% attached, and 20% apartment by 2075. Refer to Figure 11. Assumption of Shifts in Residential Unit Type 2015 to 2075.

4. This results in an average of 5.85 units per acre for the first half of the forecast period (30 years). While significantly different from the existing average residential density in Turner Valley and Black Diamond, these densities reflect the towns' aspirations to achieve higher residential densities over time.

Forecast

The residential forecasts estimate that the combined housing demand in Turner Valley and Black Diamond will average in the range of: 74 to 97 additional units per year from 2015 to 2045, 124 to 192 additional units from 2045 to 2075. Over the 60-year timeframe this means an additional 5,900 to 8,700 units will be added to Turner Valley and Black Diamond. Based on the shift in housing types, the remaining residential capacity within two towns' existing boundaries, and the assumption for an increasing density target, residential forecasts estimate that combined, the towns will need an additional 132 to 191 acres to accommodate residential development from 2015 to 2045, and an additional 413 to 712 acres to accommodate residential development from 2045 to 2075. Over the 60-year planning timeframe **the towns will need an additional 545 to 903 acres (outside of the towns' existing boundaries) to accommodate the expected population growth from 2015 to 2075.**

Refer to Figure 12. Residential Land Need 2015 to 2075. In the three scenarios, the full range of expected residential land demand is explored in order to determine the potential and costs of growing to different extents.

Commercial Land Demand

Currently, Turner Valley and Black Diamond are comprised of locally-oriented retail and service businesses that meet the day-to-day needs of residents in the towns and nearby surrounding rural areas, such as a grocery store, pharmacy, convenience stores, liquor stores, restaurants/cafes, bank, pubs, laundromat, and gas stations. There are no regionally-oriented retail and

service businesses in the two towns, as these kind of businesses tend to locate in major commercial centres or in locations with convenient vehicular access to a large regional or sub-regional trade area population (often 50,000 customers or more). However, businesses in Turner Valley and Black Diamond serve residents of the two towns, plus residents of the surrounding local areas. The estimated population of the trade area as of 2011 was 8,352, with an average annual incremental growth of 159 people per year since 2006. The boundaries of the primary commercial trade area for the two towns is south of Priddis, north of Longview, west of the mid-point between Black Diamond and Okotoks, and east of Sheep River Provincial Park in Kananaskis. Refer to Figure 9. Turner Valley and Black Diamond in the Region.

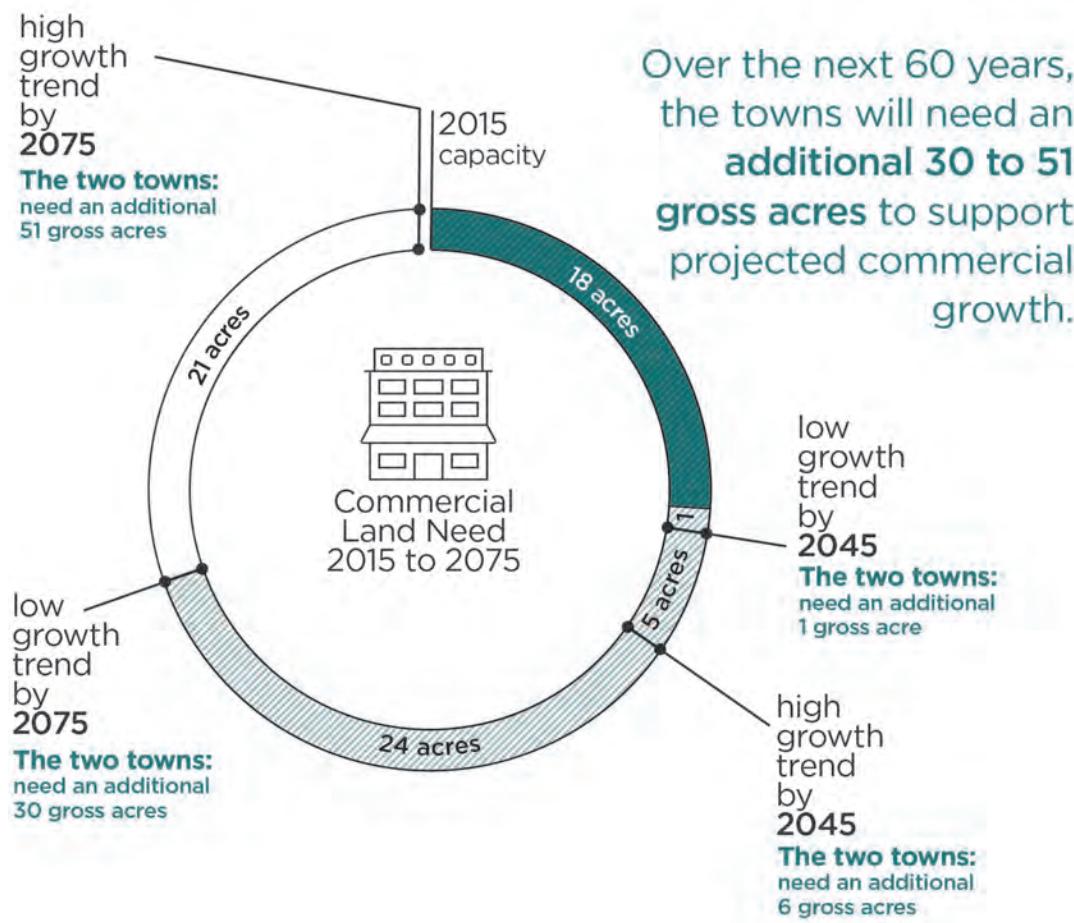
Future requirements for commercial land in Turner Valley and Black Diamond were calculated in three steps: (1) an analysis of current businesses in the towns, (2) the existing floor space per capita ratio for the towns and for the trade area, and (3) speculation of the future roles of the two towns as commercial centres over the 60-year forecast period. Using these components, and average density of development assumption, the forecast of future commercial floor space growth is translated into an estimate of commercial land requirements.

Land Supply

As shown in Figure 3. Current Planned Growth for the Two Towns, Turner Valley has a total of 263.9 acres of land available for urban development, of which 6.4 acres are designated for commercial development. In contrast, Black Diamond has approximately 84.5 acres of land available for urban development, of which 11.6 acres is designated for commercial development. The total available commercial land for the two towns is 18 acres.

FIGURE 13.
COMMERCIAL LAND NEED 2015 TO 2075

This chart depicts the towns' joint existing capacity for future commercial development, as well as their expected commercial land need based on low and high growth trends.



Key Assumptions

For this forecast, a series of assumptions were made in order to estimate future commercial land requirements for the two towns, these assumptions include the following:

1. It is estimated that Turner Valley and Black Diamond have a ratio of 27 square feet per capita, based on trade area population estimates of 8,951 and the commercial floor space inventory of 238,435 square feet.
2. Furthermore, it is estimated that the 27 square feet per capita is broken up as: 20 square feet per capita capita of locally-serving retail and service floor space and 6 to 8 square feet per capita of locally-serving office space. This estimate is based on the following series of factors and assumptions:

Over the next 60 years, the towns will need an **additional 30 to 51 gross acres** to support projected commercial growth.

- Communities (in western Canada) tend to support about 20 square feet per capita of local convenience-oriented retail and services.
- Communities (in western Canada) tend to support about 25 square feet per capita of regional destination or comparison retail space.
- Smaller communities (in western Canada) that are not regional business centres tend to support about 6 to 10 square feet per capita of local-oriented office space.
- Based on the existing patterns of commercial development in Turner Valley, Black Diamond, Okotoks, and Calgary:
 - The two towns are likely retaining almost all of their local convenience retail and personal services demand.

- The trade area residents likely visit Calgary and Okotoks for almost all of their regional destination and comparison shopping.
- The two towns likely retain a share of their locally-oriented office business demand, however Calgary and Okotoks is absorbing some of the towns' demand.

3. The two towns are not likely to attract regionally-oriented retail and service businesses over the forecast period, however they will continue to attract additional retail and service businesses that serve local and nearby rural area residents. Therefore, as the local trade area population grows (due to residential development), the demand for locally-oriented retail and personal service businesses will grow, so it is assumed that the trade area will continue to support the 27 square feet of retail, service, and office space per capita, and this growth will be focused within the two towns rather than the surrounding rural areas.

4. An assumed average density for new commercial development is a Floor Area Ratio (FAR) of 0.30 on net developable land area.

5. An assumed allocation of 35% of gross land area for municipal reserves, environmentally sensitive areas, roads, and stormwater management.

Forecast

Population projections estimate that the trade area will grow from 8,951 people (2015) to between 24,040 and 30,613 by 2075. From these population estimates, the potential commercial floor space growth is a total of 411,000 to 588,000 square feet by 2075. Based on these population forecasts, the estimated floor space per capita ratio, and an assumed commercial development density, total gross commercial land requirements indicate 48 to 69 acres of commercial land is required by the year 2075; an additional 19 to 24 acres of land by 2045, and 30 to 45 acres between 2045 and 2075. Refer to Figure 13. Commercial Land Need 2015 to 2075. Based on current capacity (the roughly 18 acres of commercial land left for development in the two towns), an additional 30 to 51 acres

outside of the towns' existing boundaries are required to accommodate market-driven commercial growth over the forecast period. However, **given the likelihood of the higher growth scenario occurring and pressure around securing commercial land, 51 acres (rather than 30) is used as a target for additional commercial land for the three scenarios.**

Industrial Land Demand

As of 2015, there was a total of about 96,900 square feet of industrial space in Turner Valley and Black Diamond (half of which is located in JKR Business Park in Black Diamond). This industrial development has largely occurred over the past 30 years, and based on recent building permit data, there has been little industrial development in more recent years. Demand for industrial development has likely been limited due to the lack of a direct, major highway corridor connection and other locations (such as the Highway 2 corridor to Okotoks) attracting a significant amount of industrial development.

Currently, industrial space in the two towns is occupied by businesses that mainly serve the businesses and residents of the local trade area, such as building material suppliers, automotive sales and services, trades workshops, professional services, mini-storage, and recycling and waste disposal services. There are few businesses that serve the regional, provincial, or broader markets.



Floor area ratio is the ratio of the total gross floor area of all buildings on a parcel to the area of the parcel.



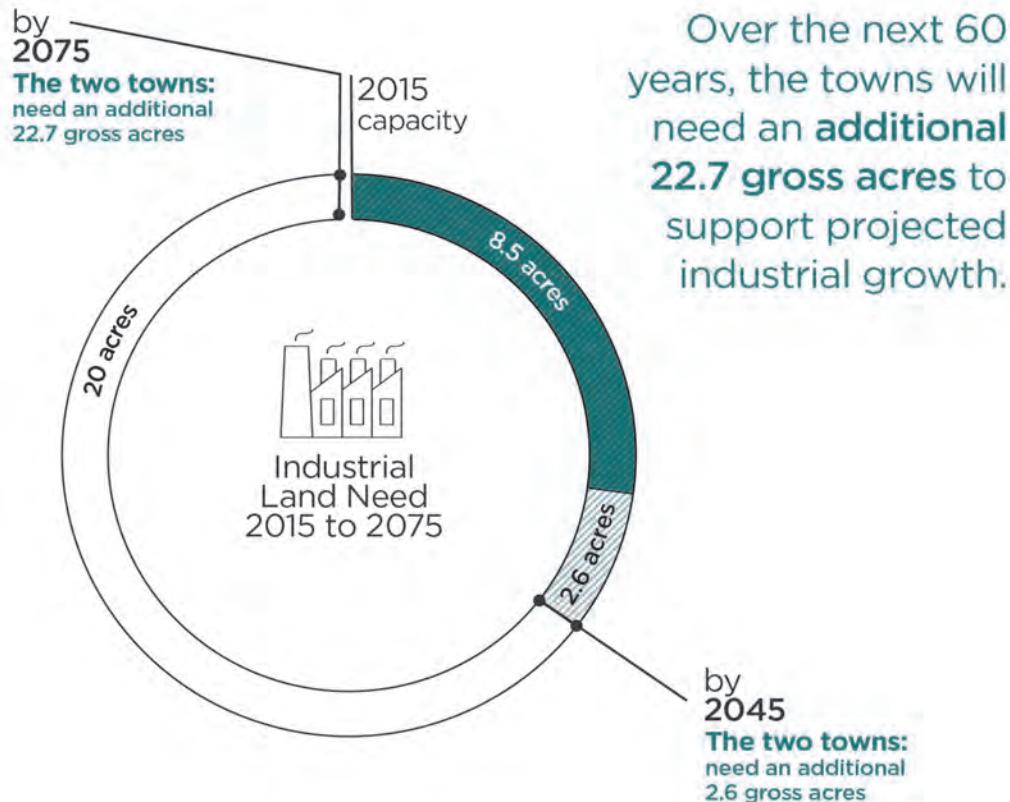
Net developable land area is the area of land available for development excluding non-developable areas (environmental reserve, expressways, railways and lands unsuitable for development).

Land Supply

As shown in Figure 3. Current Planned Growth for the Two Towns, the current ASPs and planned future development for Turner Valley has no available land for industrial development, and Black Diamond has only 8.5 acres available for industrial development.

FIGURE 14.
INDUSTRIAL
LAND NEED
2015 TO 2075

This chart depicts the towns' joint existing capacity for future industrial development, as well as, their expected industrial land need.



Key Assumptions

Several assumptions were made in the industrial land demand forecast, including the following:

1. Turner Valley and Black Diamond will remain suburban communities in the Calgary Region, with its share of regional employment remaining stable over time.
2. Calgary is likely to continue to capture the largest share of regional employment growth. The large amount of vacant industrial-designated land in North/ Northeast and Southeast sectors of Calgary will continue to accommodate the vast majority of industrial development in the Calgary Region.

3. Okotoks and the Highway 2A Industrial Corridor play a large role in the industrial market outside of Calgary, and will continue to capture most of the industrial businesses that require convenient access to the regional highway system and wish to be located south of Calgary.
4. The average density for new industrial development will be 0.25 FAR on the net developable land area.
5. An assumed allocation of 35% of gross land area for municipal reserves, environmentally sensitive areas, roads, and stormwater management.

**FIGURE
15. LAND
REQUIREMENTS
FOR GROWTH
IN TURNER
VALLEY
AND BLACK
DIAMOND**

	2015 to 2045		2045 to 2075		Total 2015 to 2075	
	Lower	Higher	Lower	Higher	Lower	Higher
Residential Turner Valley	-	-	178	347	178	347
Residential Black Diamond	132	191	235	365	367	556
Residential Total	132	191	413	712	545	903
Commercial Total	1	6	30	45	30	51
Industrial Total	3	3	20	20	23	23
Total Land Needs	135	199	463	778	598	977

Forecast

Based on these assumptions, it is unlikely that Turner Valley and Black Diamond will attract a significant number of industrial businesses that serve regional, provincial, or broader markets. Future industrial floor space growth in the two towns is expected to mainly be linked to the overall pace of growth in the towns, and is therefore expected to grow by average of about 2% per year. Therefore, it is expected that Turner Valley and Black Diamond will need an additional 11 acres of industrial land by 2045 and another 20 acres by 2075, totalling an additional 31 acres of required industrial land over the entire forecast period. Refer to Figure 14. Industrial Land Need 2015 to 2075. Given the towns' existing industrial capacity, **the two towns will need an additional 23 acres (outside of the towns' existing boundaries) to accommodate the expected industrial growth over the next 60 years.**

Land Requirements

At the time of this study, the two towns have a total of 349 acres of land available for urban development within their existing town boundaries, approximately 85 acres in Black Diamond and 264 acres in Turner Valley. Existing ASPs and development plans that have identified future land uses for this available land (as illustrated in Figure 3. Current Planned Growth for the Two Towns) determines the remaining capacity for growth for each town and therefore the additional land use need for each town (refer to Figure 15. Summary of Land Requirements for Turner Valley and Black Diamond). In addition to this existing capacity for growth, forecasts determine that the two towns need **an addition of between 545 to 903 acres of residential land, 51 acres of commercial land, and 23 acres of industrial land** to accommodate future population growth. In the scenarios, land identified for development beyond these targets, is contingency land; strategic land supply in case growth goes beyond what is expected by the higher growth trend. These land requirement estimates, in conjunction with the land supply assessment and infrastructure capacity, are the basis for the development of the three scenarios, in guiding the amount of land to allocate per land use.

This figure illustrates the required additional land (outside of the existing towns' boundaries) based on the projected land needs for residential, commercial, and industrial uses. For the purposes of developing the scenarios, the low growth trend was used as the minimum land required (the demand) while the high growth trend was used to identify the amount of additional land that could be considered in the scenarios for strategic, contingency purposes.



Scenarios for Growth

Scenarios for Growth

Overview of Growth Scenarios

The development of the growth scenarios was informed by multiple perspectives, factors, and inputs, such as the vision and principles, as well as the growth forecasts; land requirements; defensive and offensive strategies; town staff, public, and stakeholder input and direction; and Calgary Metropolitan Plan implementation. Additionally, a set of planning principles were used to guide and evaluate the three scenarios.

SCENARIO

1

Two
Towns
Grow
Together

SCENARIO

2

Two
Towns
Grow
Apart

SCENARIO

3

Joint
Advisory
Committee
Direction

Development of the Growth Scenarios

Scenario Components

For each concept, the same general land use approach was applied, consisting of two major components: “demand” and “strategic” land uses. Demand areas are intended to accommodate the land requirements identified by the land needs projections. Whereas the strategic areas act as contingency land to satisfy the potential for growth beyond the higher growth forecasts, as well as logical border completions, when needed. However, the approach for identifying demand and strategic land area targets varied slightly based on each land use type and local context and needs. A brief description of the eight land use types and their intention is provided below.

- » **Residential** land use areas were identified to accommodate the growth forecast range of between 545 and 903 acres. While each scenario provides different options of where this residential development might go, they all meet comprise of at least 545 acres of residential land.
- » **Residential - Strategic** areas are contingency lands that can satisfy a potentially higher rate of growth, though is more generally applied for logical border completions with respect to quarter sections and parcels.
- » **Commercial** land use areas were identified to accommodate the higher growth forecast as there was general consensus on the need for extra land area than the lower forecast called for as a precautionary measure to ensure healthy and fiscally sustainable economic development for the towns.
- » **Commercial - Strategic** was not identified for all scenarios, only in Scenario 2 and primarily to serve as transition buffer between employment lands residential development, should the need arise.
- » **Employment** land areas were identified to meet the industrial land need forecast.

- » **Employment - Strategic** consists of identified lands as a contingency land supply. In case a large format store or other major employment centre (i.e. business park) requires a substantial area of land, the towns will have a strategic employment land holding to be able to accommodate potential job centres of any size.
- » **River Valley - Strategic** is identified in all three scenarios as a key component to providing connectivity between the towns, ensuring ecological health for the area, preserving environmentally sensitive areas, and promoting the integration of a parks and open space network within future development. The size of this area varies across all three scenarios to account for a variety of options, such as the incorporation of the Friendship Trail, extension across and north of the river, and the inclusion of existing MD of Foothills country residential development.
- » **Gateway - Strategic** land areas are identified at major gateways to Turner Valley, where future development could potentially occur. These areas act as contingency land for future commercial and/or employment land uses, as needed, while ensuring the quality of major entrances to the town.

LAND USES

RESIDENTIAL

RESIDENTIAL - STRATEGIC

COMMERCIAL

COMMERCIAL - STRATEGIC

EMPLOYMENT

EMPLOYMENT - STRATEGIC

RIVER VALLEY - STRATEGIC

GATEWAY - STRATEGIC

Scenario Evaluation

Together, the Vision and Principles guided the development of the three growth scenarios and the evaluation of their success in meeting the towns' vision for future growth. The Joint Growth Strategy Principles were used to evaluate the scenarios and planning process, beyond just the assessment of the scenario's infrastructure servicing costs. These Principles act as a check, to ensure that planning best practices and context are also considered in the evaluation of the scenarios. In evaluating the scenarios the following questions were asked of each scenarios:

1. Is the scenario **jurisdictionally neutral**, does it assess the potential of the entire study area regardless of boundaries?
2. Is the scenario **equitable and inclusive**, are the future costs and benefits equitably distributed between the towns?
3. Is the scenario **efficient**, does it promote servicing efficiency and reduce the cost of accommodating future growth?
4. Is the scenario **sustainable**, are environmentally significant areas and natural resources maintained and conserved, while supporting economic vitality and complete communities?
5. Is the scenario **flexible and resilient**, does it have the ability to evolve and adapt to changing realities to respond to both local and regional growth factors?
6. Is the scenario representative of **local knowledge**, was it developed in consultation with both communities and input from all parties?

Scenario 1: Two Towns Grow Together

This scenario is comprised of two distinct iterations, however, both revolve around the idea that the two towns grow together, leveraging shared infrastructure and development to reduce costs, facilitate compact growth, and strengthen the two towns shared vision and sense of community.

Scenario 1A

Concept

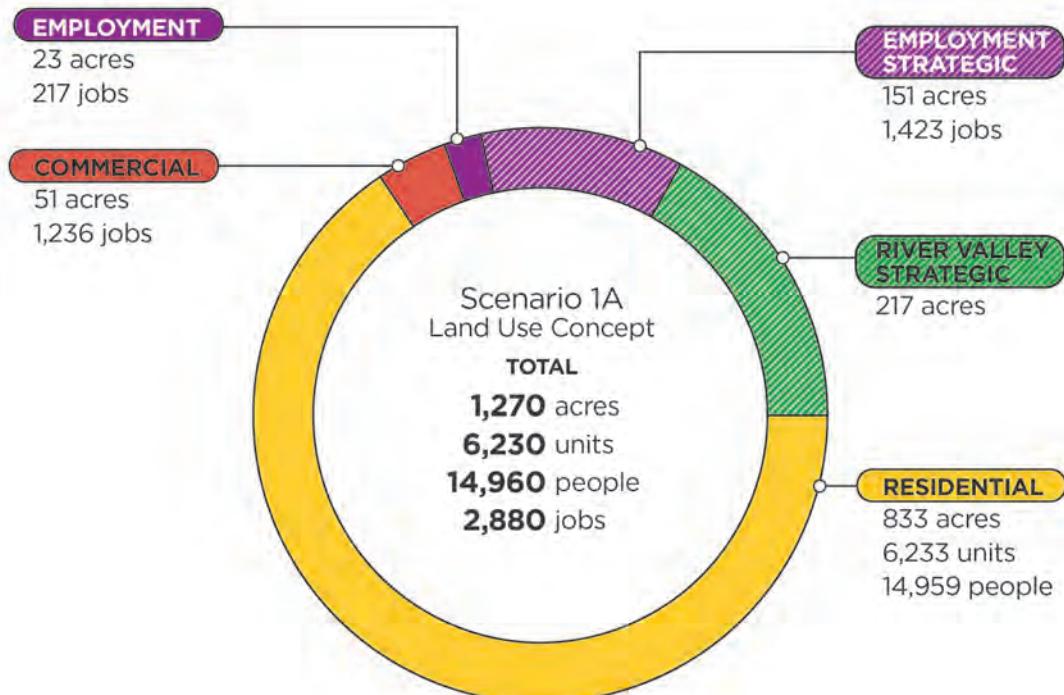
Scenario 1A serves to create indistinguishable borders, with future growth concentrated in the least constrained lands, including a substantial amount of strategic employment land, as well as an area of River Valley Lands to create an environmental and open space connection between the two towns. In this

scenario, growth area lands total 1,270 acres (the equivalent of 8.0 quarter sections), which supports approximately 14,960 people and 2,880 jobs. Refer to Figure 16. Scenario 1A Concept Statistics. The concept for this scenario was based on several key ideas as identified in Figure 17. Scenario 1A Concept, and summarized below.

- » Builds off of the Gateways of Turner Valley ASP to expand residential development west of the town (1), thereby complementing adjacent uses and capitalizing on road network accessibility.
- » Locates additional residential development (2) adjacent to existing residential communities, creating continuity.
- » The continuation of commercial development (3) along Highway 22, making use of existing infrastructure and accessibility.
- » Provides a new commercial node (3) to service new residential populations.

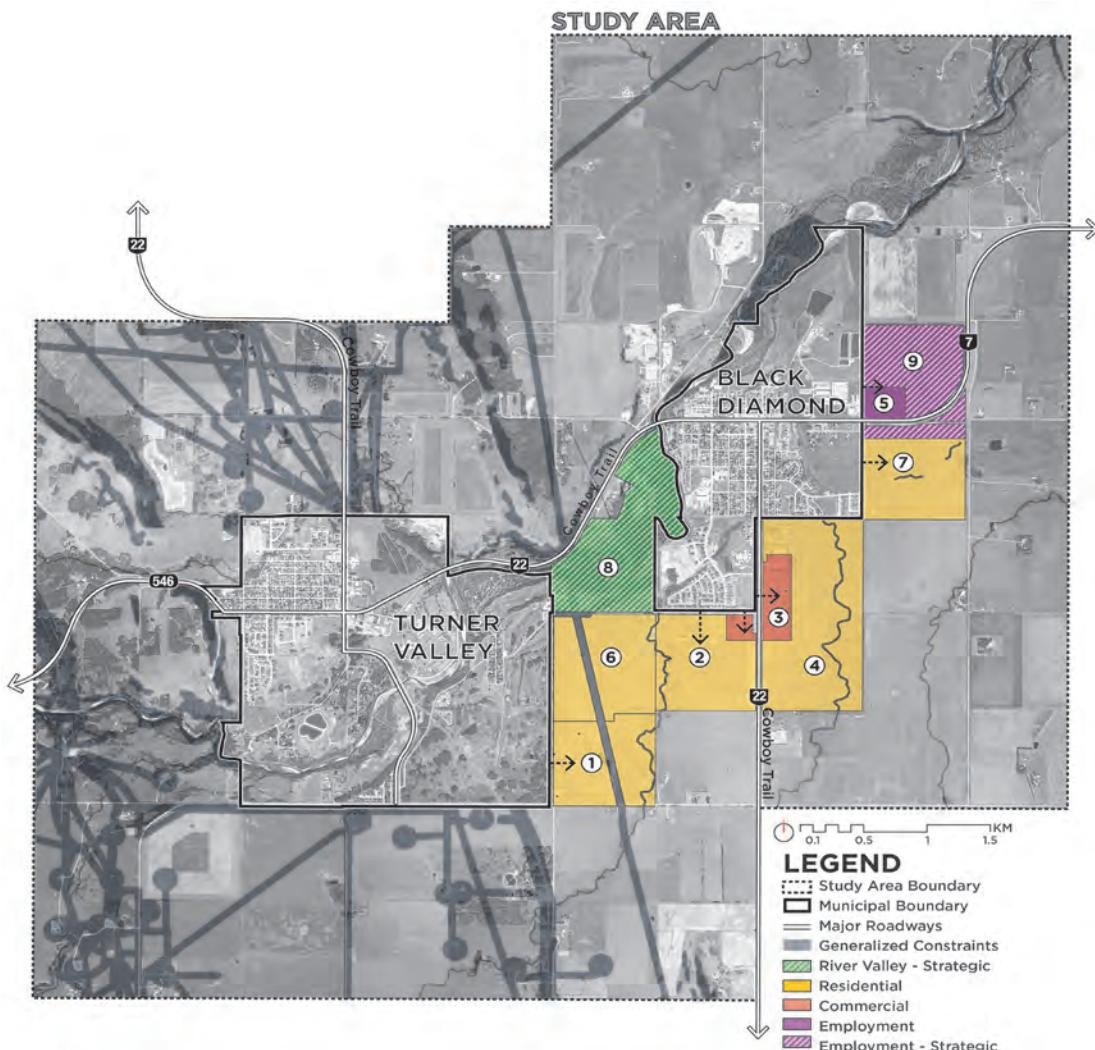
**FIGURE 16.
SCENARIO
1A CONCEPT
STATISTICS**

This chart depicts the acres per land use type for Scenario 1A, as well as their associated population and job estimates.



**FIGURE 17.
SCENARIO 1A
CONCEPT**

This map depicts Scenario 1A's land use concept, highlighting the major ideas as described in the narrative.



- » A logical extension east and south of Black Diamond in areas (4) that allow for a contiguous town border and development in areas of minimal constraints.
- » Industrial development (5) along Highway 7 to capitalize on the Highway's access to Highway 2.
- » A continuation of similar uses (5) to create continuity and minimize conflicts.
- » Allocation of residential lands (6) to accommodate some (though not all) of the population in the high growth scenario.
- » Residential development (7) on area adjacent to planned Black Diamond

residential growth area (Kaiser ASP).

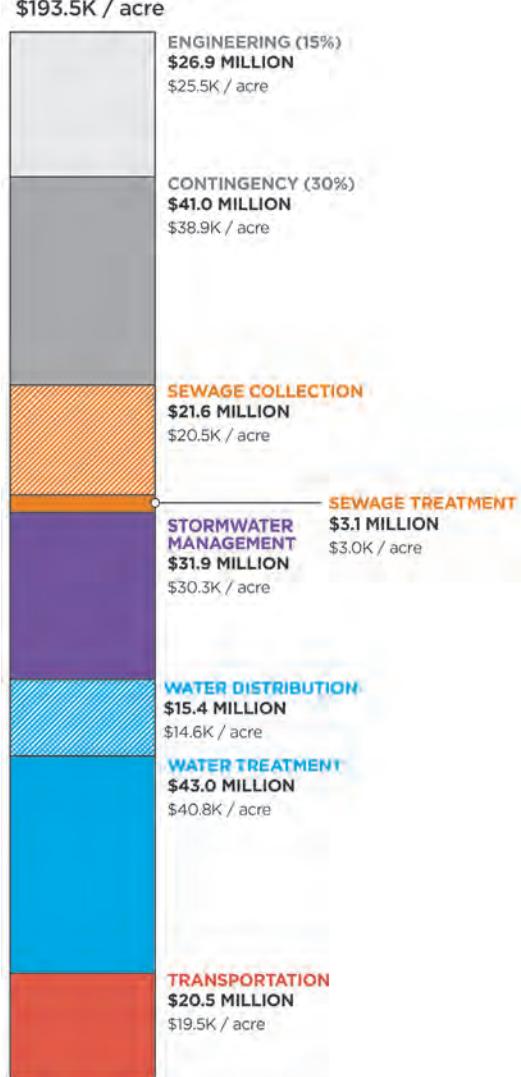
- » Green infrastructure (8) to preserve Sheep River as a major open space connection, excluding the existing country residential development.
- » Strategic employment lands (9) based on adjacent uses, proximity to Highway 7, and the benefits of flanking Highway 7 on both sides for consistent, dual frontage.

Infrastructure Servicing

The total infrastructure and servicing cost of Scenario 1A is \$203.9 million (including \$41.0 million as contingency and \$26.9 million for engineering fees). This scenario is the middle for total infrastructure cost and for total cost per acre, at \$193,120 per acre. Refer to Figure 18. Scenario 1A Infrastructure Servicing Costs.

**FIGURE 18.
SCENARIO 1A
INFRASTRUCTURE
SERVICING COSTS**

This figure provides a breakdown of the infrastructure costs associated with the development of Scenario 1A, and the cost per acre.



TRANSPORTATION

The total estimated transportation costs for Scenario 1A are \$20.5 million, \$19,420 per acre of development (this does not include extra for contingency or engineering fees). However, potential terrain challenges may increase project cost. The estimated magnitude of traffic growth on the existing highways is between 4 and 18. Transportation network investments include the following (refer to Figure 19. Scenario 1A Transportation Concept):

- » 13 (seven existing, six new) intersection improvements along the proposed and existing network.
- » 7.4 km of additional road required to support the growth scenario.

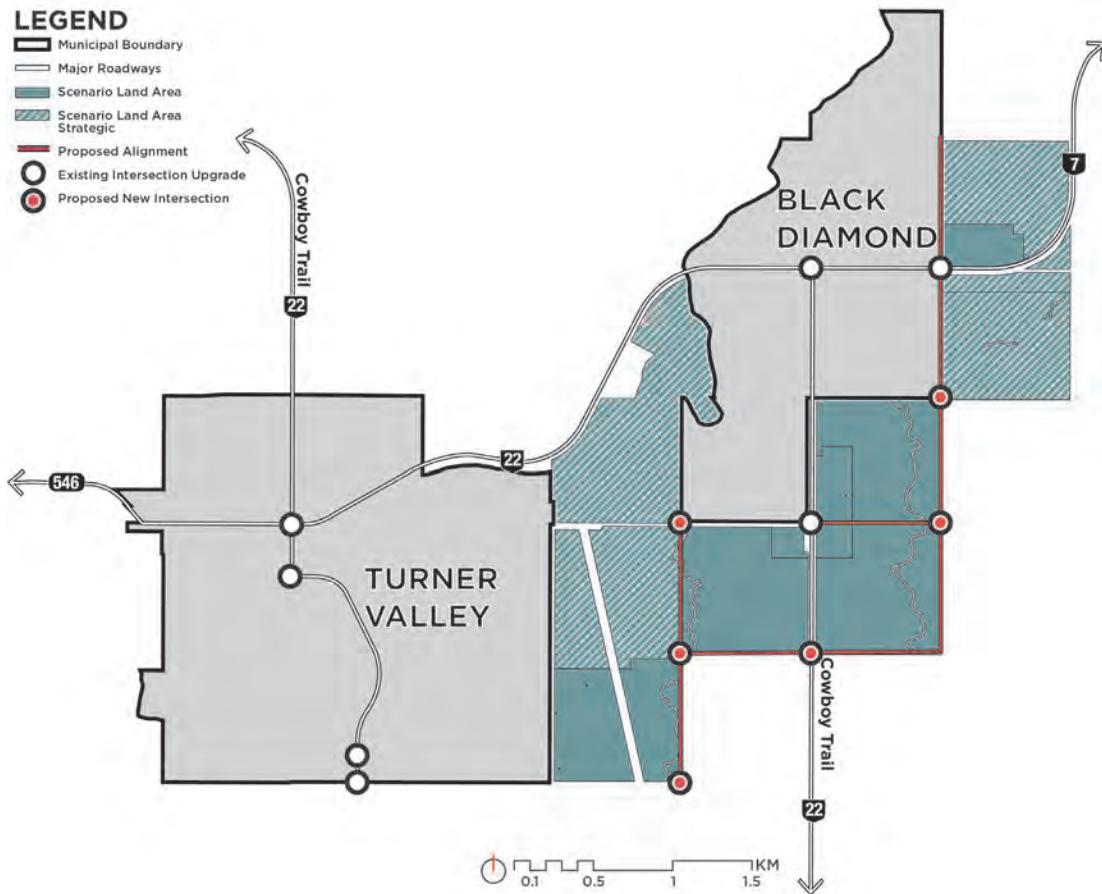
POTABLE WATER

The total estimated potable water costs for Scenario 1A are \$58.4 million, \$55,310 per acre of development (this does not include extra for contingency or engineering fees). As in all scenarios, it will be necessary to secure sufficient water license capacity and twin of the distribution transmission main from Turner Valley to Black Diamond. Also, there will be a need to upgrade source capacity, the treatment plant, and the pumps in TV Water Treatment Plant to increase flow from Turner Valley to the potable water reservoir in Black Diamond. Additional upgrades include the following (refer to Figure 20. Scenario 1A Potable Water Concept):

- » Reservoir upgrades and an additional reservoir will be required to accommodate additional storage.
- » Replace reservoir pump station.
- » Upsize the distribution pipe from the reservoir to the distribution system.
- » A new PRV station to manage the system pressures.
- » Add a booster station to increase flow.
- » Various distribution mains to loop the system to provide adequate pressure, flow, and redundancy.

LEGEND

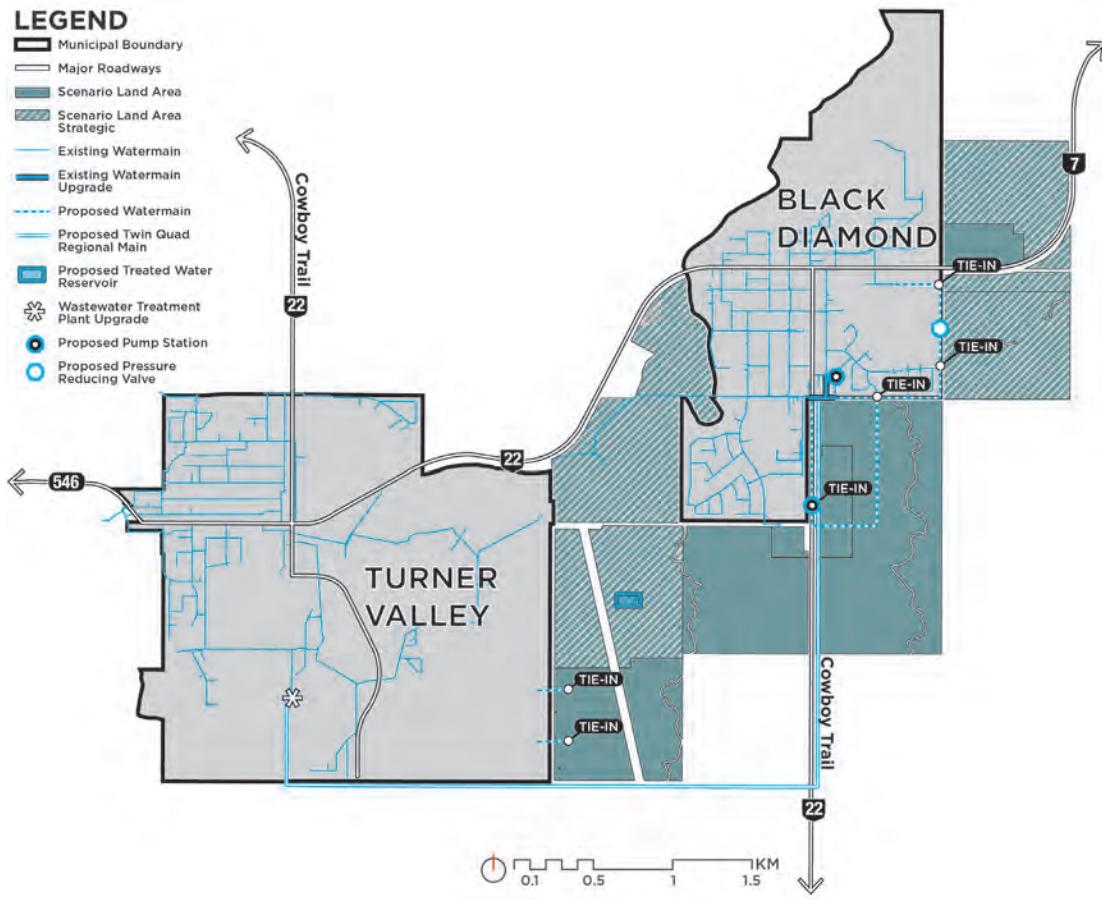
- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Proposed Alignment
- Existing Intersection Upgrade
- Proposed New Intersection

**FIGURE 19.****SCENARIO 1A TRANSPORTATION CONCEPT**

This figure illustrates the transportation concept for Scenario 1A, including a proposed alignment, additional intersections, and intersection upgrades.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Existing Watermain
- Existing Watermain Upgrade
- Proposed Watermain
- Proposed Twin Quad Regional Main
- Proposed Treated Water Reservoir
- Wastewater Treatment Plant Upgrade
- Proposed Pump Station
- Proposed Pressure Reducing Valve

**FIGURE 20.****SCENARIO 1A POTABLE WATER CONCEPT**

This figure illustrates the potable water concept for Scenario 1A, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 1A.

STORMWATER

The total estimated stormwater costs for Scenario 1A are \$21.6 million, \$20,460 per acre of development (this does not include extra for contingency or engineering fees). Based on existing contours, nine catchments, each with a stormwater detention facility, are proposed to attenuate storm flow for Scenario 1A. Stormwater detention facilities will generally discharge into the existing creeks nearby. However, a drainage ditch and an outfall from the north pond to the Sheep River and a ditch from the east pond to the nearby creek will be required. These ditches will require drainage easements along adjacent property lines or roads, and may require culverts under secondary highways. Additionally, one southwest pond will require a drainage connection to the south pond, or the creek, and the northwest pond will drain west along the existing highway ditch, which may require expanding the ditch. Refer to Figure 21. Scenario 1A Stormwater Concept.

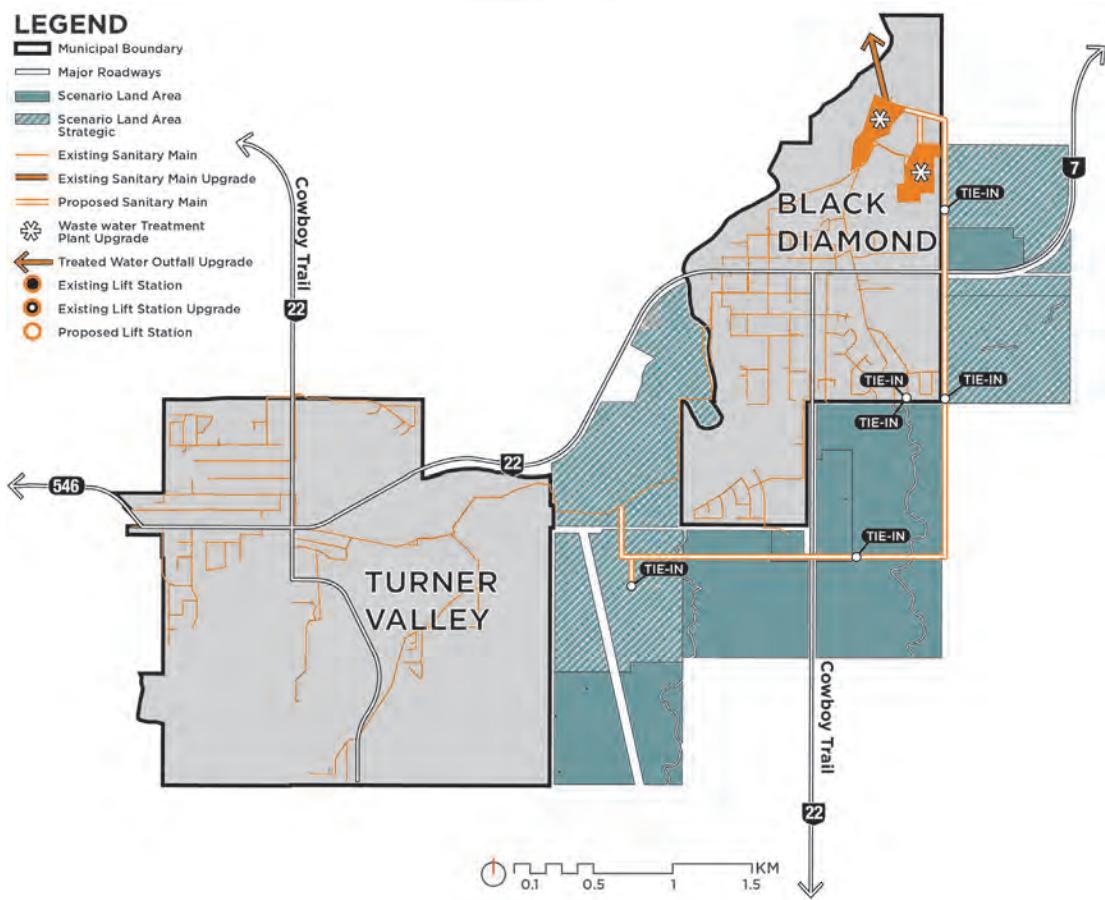
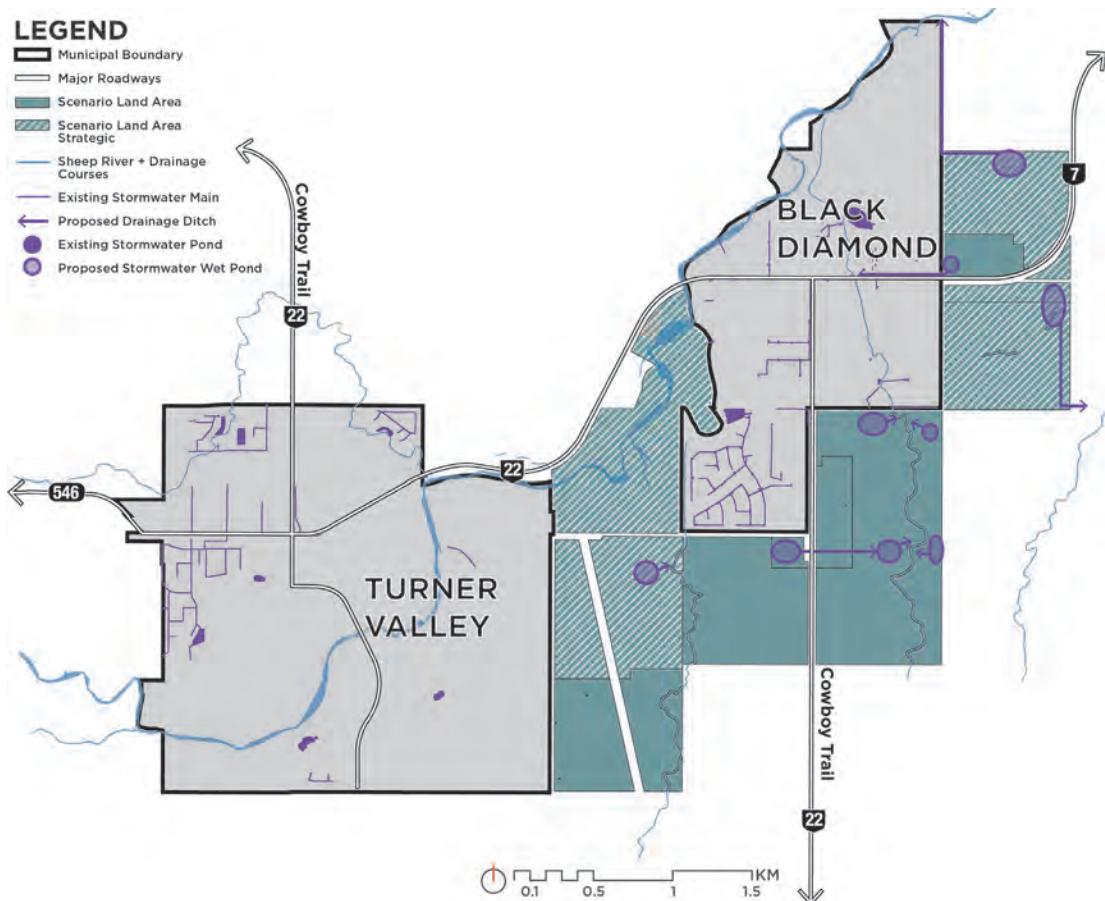
WASTEWATER

The total estimated wastewater costs for Scenario 1A are \$35.0 million, \$33,180 per acre of development (this does not include extra for contingency or engineering fees). As in all scenarios, wastewater flow from TV will connect into the BD system via the existing Westend Regional Sewage Service Commission (WRSSC) transmission main. Wastewater infrastructure investments for Scenario 1A include the following (refer to Figure 22. Scenario 1A Wastewater Concept):

- » A new 375 mm gravity line will carry the flow from the TV/BD boundary and connect into the new Wastewater Treatment Plant.
- » A new effluent outfall will be needed.

Evaluation

The concept for Scenario 1A meets all six of the Principles, by executing several beneficial strategies. This scenario builds from existing land use patterns to create contiguous residential communities, strengthen the existing Highway 22 commercial corridor, provide commercial services to the new residential communities (with the expanded Highway 22 commercial area), and flank both sides of Highway 7 with like uses (employment lands). Also, by excluding the existing country residential from the River Valley – Strategic land area, the Towns are ensuring that they have no obligation for providing municipal services. Furthermore, the development areas are largely, unconstrained lands areas free from environmental or development concerns. However, there is the potential conflict between the adjacent residential and employment land uses near Highway 7, which should both areas be fully developed, would need careful planning and design guidance to mitigate this conflict and ensure livability for the community's residents.



Scenario 1B

Concept

Similar to Scenario 1A, Scenario 1B also creates indistinguishable borders, with future growth concentrated in the least constrained lands, and an area of River Valley Lands between the two towns to create an environmental and open space connection. Additionally, in this scenario, there is also a new commercial node along Highway 22. However, the concentration of Employment Lands is located along Highway 22 instead of Highway 7. In this scenario, growth area lands total 1,130 acres (the equivalent of 7.0 quarter sections), which supports approximately 12,620 people and 2,710 jobs. Refer to Figure 23. Scenario 1B Concept Statistics. The concept for this scenario was based on several key ideas as identified in Figure 24. Scenario 1B Concept, and summarized below.

- » Builds off of the Gateways of Turner Valley ASP to expand residential development west of the town (1), thereby complementing adjacent uses and capitalizing on road network accessibility.
- » Locates additional residential development (2) adjacent to existing residential communities, creating continuity.
- » The continuation of commercial development (3) along Highway 22, making use of existing infrastructure and accessibility.
- » Provides a new commercial node (3) to service new residential populations.
- » A logical extension east and south of Black Diamond in areas (4) that allow for a contiguous town border and development in areas of minimal constraints.

**FIGURE 23.
SCENARIO
1B CONCEPT
STATISTICS**

This chart depicts the acres per land use type for Scenario 1B, as well as their associated population and job estimates.

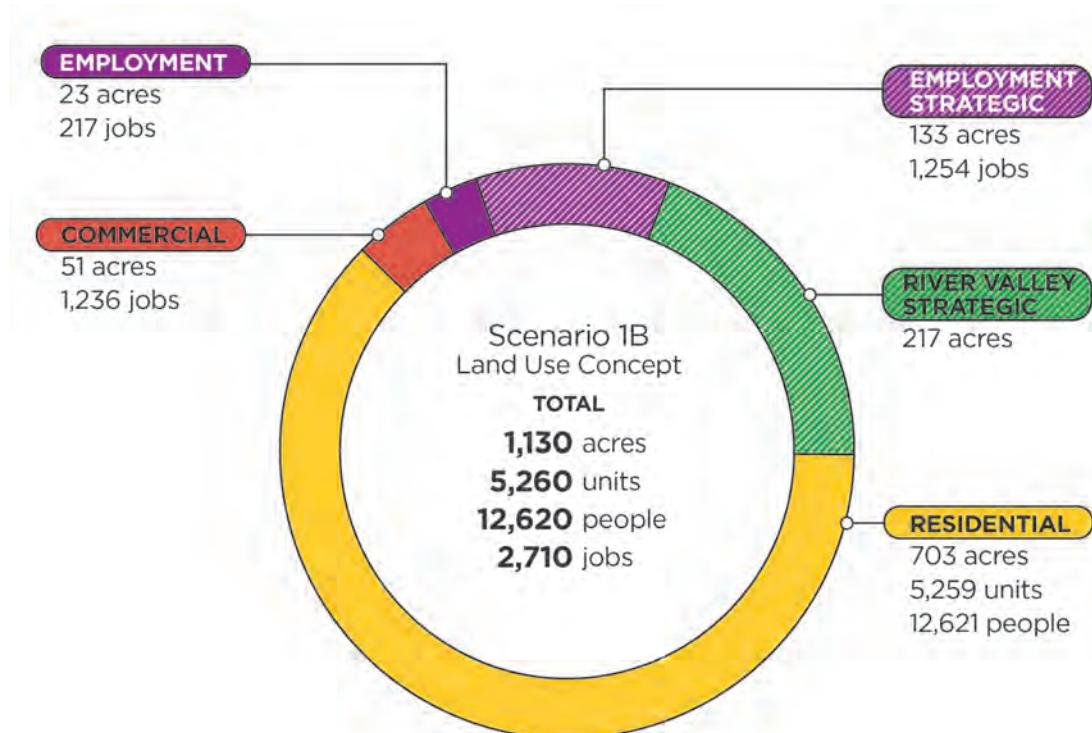
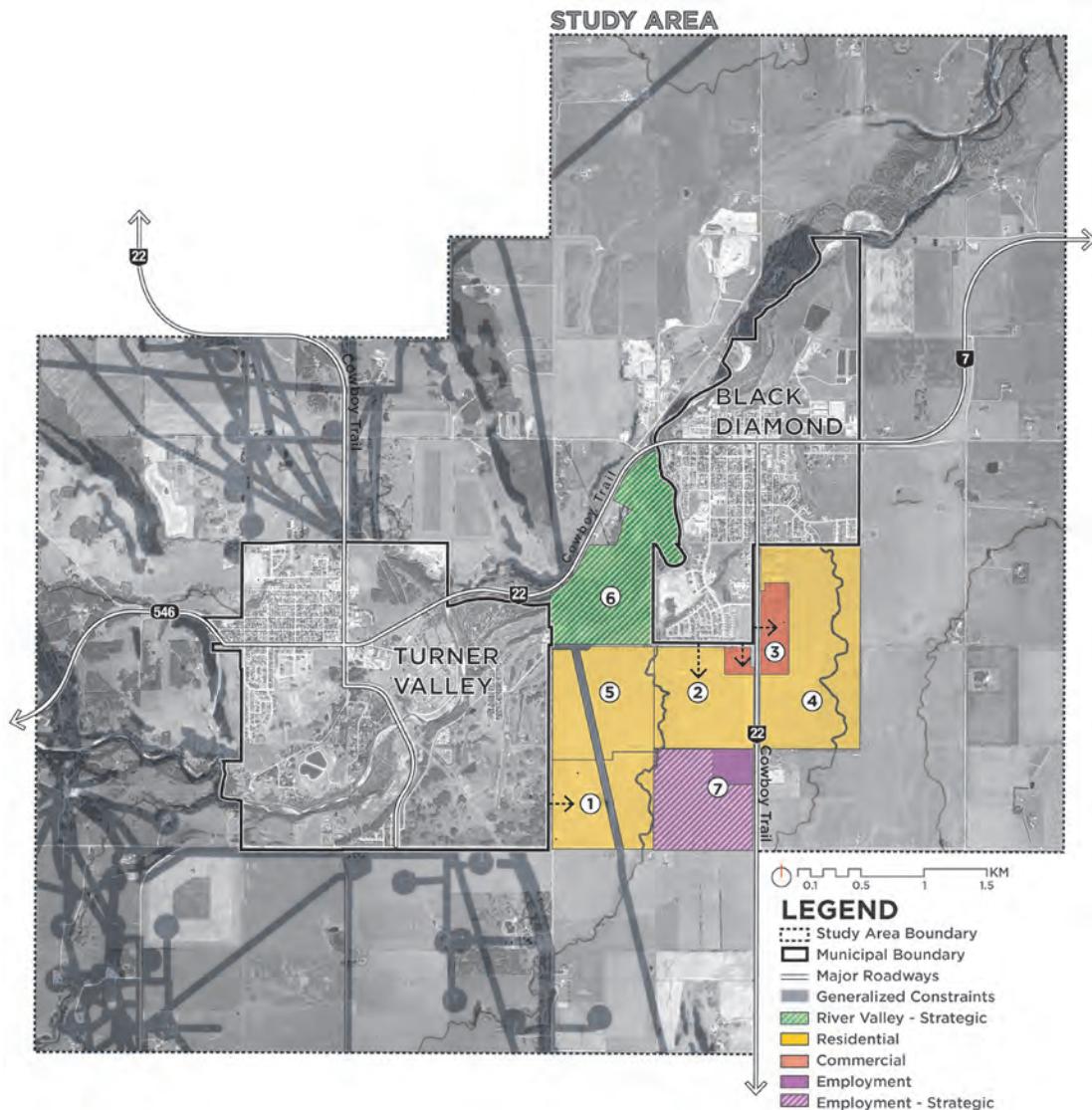


FIGURE 24.
SCENARIO 1B
CONCEPT

This map depicts Scenario 1B's land use concept, highlighting the major ideas as described in the narrative.



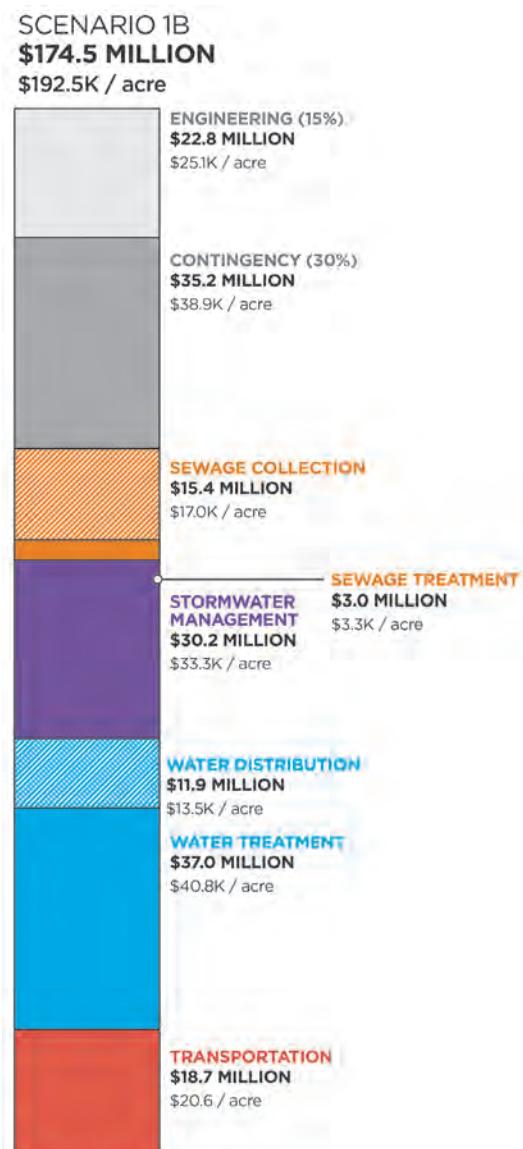
- » Allocation of residential lands (5) to accommodate some (though not all) of the population in the high growth scenario.
- » Green infrastructure (6) to preserve Sheep River as a major open space connection, excluding the existing country residential development.
- » Shifts industrial and strategic industrial to the southern extent of the concept (7), as an extension of Highway 22 corridor, and exploring appropriateness of Highway 22 as a trucking and good movements corridors.

Infrastructure Servicing

The total infrastructure and servicing cost of Scenario 1B is \$174.5 million (including \$35.2 million as contingency and \$22.8 million for engineering fees). This scenario is the second least expensive for total cost of infrastructure investments, and has a total cost per acre of \$192,130 per acre. Refer to Figure 25. Scenario 1B Infrastructure Servicing Costs.

**FIGURE 25.
SCENARIO 1B
INFRASTRUCTURE
SERVICING COSTS**

This figure provides a breakdown of the infrastructure costs associated with the development of Scenario 1B, and the cost per acre.



TRANSPORTATION

The total estimated transportation costs for Scenario 1B are \$18.7 million, \$20,570 per acre of development (this does not include extra for contingency or engineering fees). The estimated magnitude of traffic growth on the existing highways is between 4 and 18. Transportation network investments include the following (refer to Figure 26. Scenario 1B Transportation Concept):

- » 13 (seven existing, six new) intersection improvements along the proposed and existing network.
- » 6.6 km of additional road required to support the growth scenario.

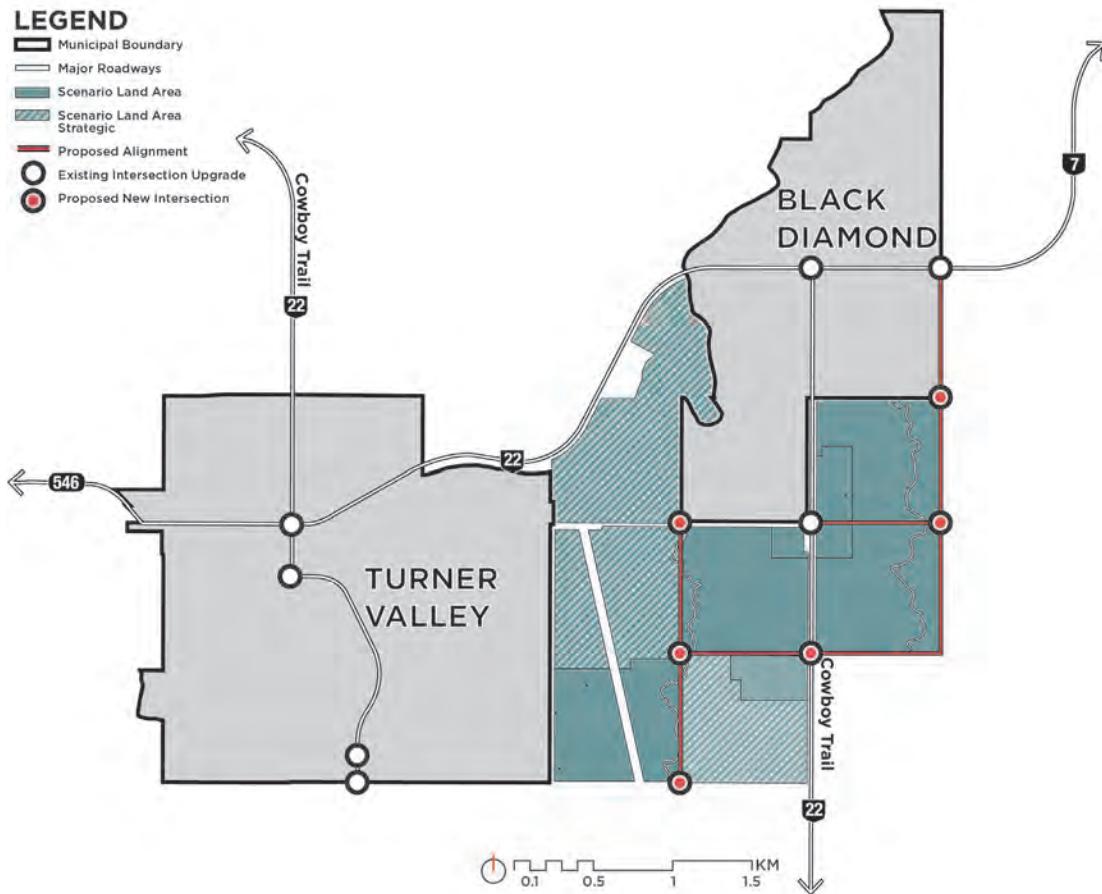
POTABLE WATER

The total estimated potable water costs for Scenario 1B are \$48.9 million (\$53,870 per acre of development) (this does not include extra for contingency or engineering fees). As in all scenarios, it will be necessary to secure sufficient water license capacity and twin of the distribution transmission main from Turner Valley to Black Diamond. Also, there will be a need to upgrade source capacity, the treatment plant, and the pumps in TV Water Treatment Plant to increase flow from Turner Valley to the potable water reservoir in Black Diamond. Additional upgrades include the following (refer to Figure 27. Scenario 1B Potable Water Concept):

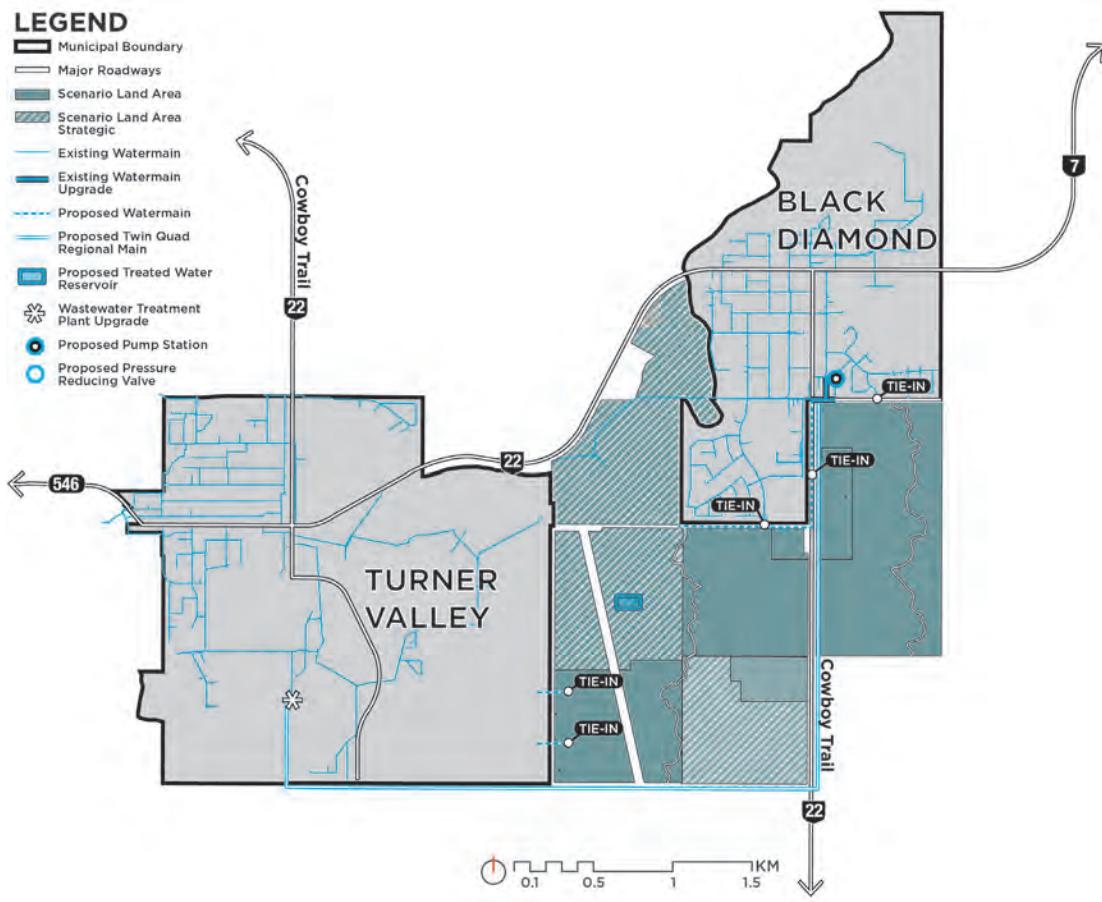
- » Reservoir upgrades and an additional reservoir will be required to accommodate an additional storage.
- » Replace reservoir pump station.
- » Various distribution mains to loop the system to provide adequate pressure, flow and redundancy.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Proposed Alignment
- Existing Intersection Upgrade
- Proposed New Intersection

**LEGEND**

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Existing Watermain
- Existing Watermain Upgrade
- Proposed Watermain
- Proposed Twin Quad Regional Main
- Proposed Treated Water Reservoir
- Wastewater Treatment Plant Upgrade
- Proposed Pump Station
- Proposed Pressure Reducing Valve



STORMWATER

The total estimated stormwater costs for Scenario 1B are \$15.4 million (\$17,000 per acre of development (this does not include extra for contingency or engineering fees). Based on existing contours, seven catchments, each with a stormwater detention facility, are proposed to attenuate storm flow for Scenario 1B. Stormwater detention facilities will generally discharge into the existing creeks nearby. However, a southwest pond will require a drainage connection to the adjacent south pond, or the creek. Refer to Figure 28. Scenario 1B Stormwater Concept.

WASTEWATER

The total estimated wastewater costs for Scenario 1B are \$33.2 million (\$36,560 per acre of development (this does not include extra for contingency or engineering fees). As in all scenarios, wastewater flow from TV will connect into the BD system via the existing Westend Regional Sewage Service Commission (WRSSC) transmission main. Wastewater infrastructure investments for Scenario 1B include the following (refer to Figure 29. Scenario 1B Wastewater Concept):

- » A 375 mm gravity line will carry the flow from the TV/BD boundary and connect into the new Wastewater Treatment Plant.
- » A new effluent outfall will be needed.

Evaluation

The concept for Scenario 1B meets all the Principles. This scenario builds from existing land use patterns to create contiguous residential communities and provide commercial services to the new residential communities (with the expanded Highway 22 commercial area), it is a fairly cost efficient concept with easily serviced and accessible residential development. Also, by excluding the existing country residential from the River Valley – Strategic land area, the Towns are ensuring that they have no obligation for providing municipal services. Furthermore, the development areas are largely, unconstrained lands areas free from environmental or development concerns and allows for ample strategic residential land to flexibly adapt and accommodate growth beyond the low growth scenario.

However, there are several caveats to this concept that make it a less desirable option. First, the shift of employment lands (7) to the south of the towns in this concept is both not very efficient for servicing and land use continuity, but also creates even larger potential land use conflicts between the surrounding residential areas. Additionally, access along Highway 7, where the employment lands were located in Scenario 1A is more desirable (it's a more major corridor) than Highway 22 access, and the single frontage along Highway 22 will pose challenges for managing development along the corridor and coordination between the MD and the towns. Finally, this scenario is far from meeting the high growth trend forecast, which is an additional goal for the Towns.

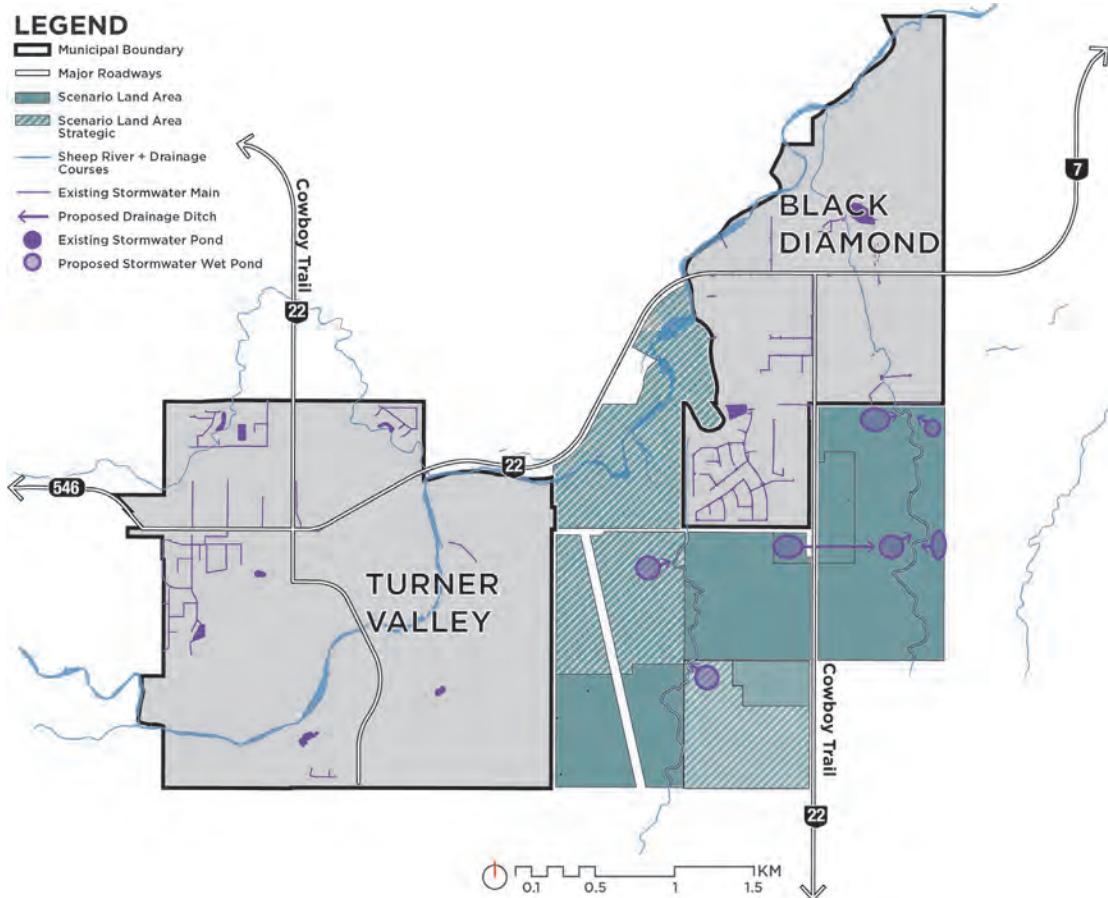


FIGURE 28. SCENARIO 1B STORMWATER CONCEPT

This figure illustrates the stormwater management concept for Scenario 1B, including proposals for additional drainage ditches and stormwater ponds that would be required with the proposed development in Scenario 1B.

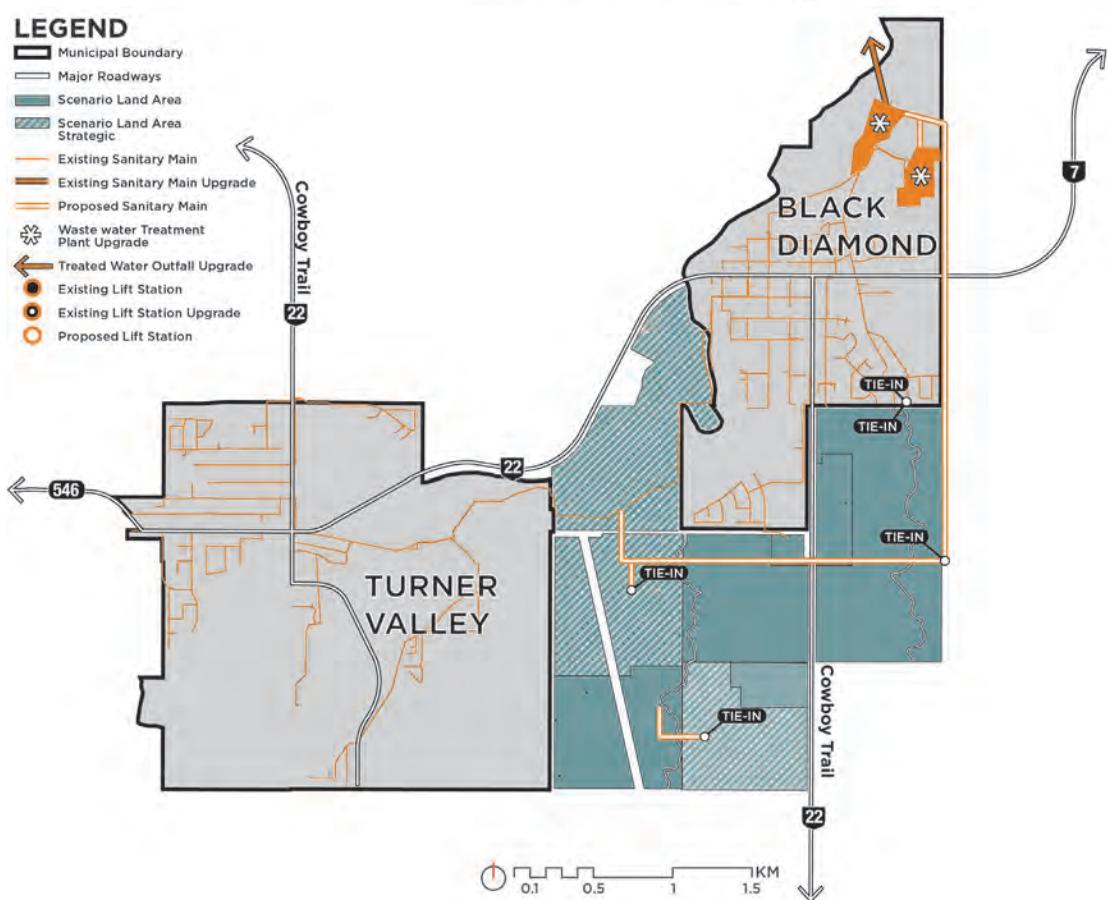


FIGURE 29. SCENARIO 1B WASTEWATER CONCEPT

This figure illustrates the wastewater concept for Scenario 1B, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 1B.

Scenario 2: Two Towns Grow Apart

In Scenario 2, also comprised of two iterations, the two towns grow apart as separate and distinct communities, with the only an environmental and open space as a shared border. A continued sharing of infrastructure will be feasible under the two iterations of this scenario, however, servicing of new development will not be as efficient as under Scenario 1.

Scenario 2A

Concept

In Scenario 2A, the two towns will be linked by an environmental and open space connection. Future growth is to the east of Black Diamond and the south of Turner Valley. There is a concentration of Employment Lands along Highway 7 (similar to Scenario 1A) and a creation of new commercial nodes along Highway 22 and Highway 7. Additionally, there is a modest supply of contingency land for additional commercial and employment land growth. In this scenario, growth area lands total 1,080 acres (the equivalent of 6.8 quarter sections), which supports approximately 11,560 people and 3,190 jobs. Refer to Figure 30. Scenario 2A Concept Statistics. The concept for this scenario was based on several key ideas as identified in Figure 31. Scenario 2A Concept, and summarized below.

**FIGURE 30.
SCENARIO
2A CONCEPT
STATISTICS**

This chart depicts the acres per land use type for Scenario 2A, as well as their associated population and job estimates.

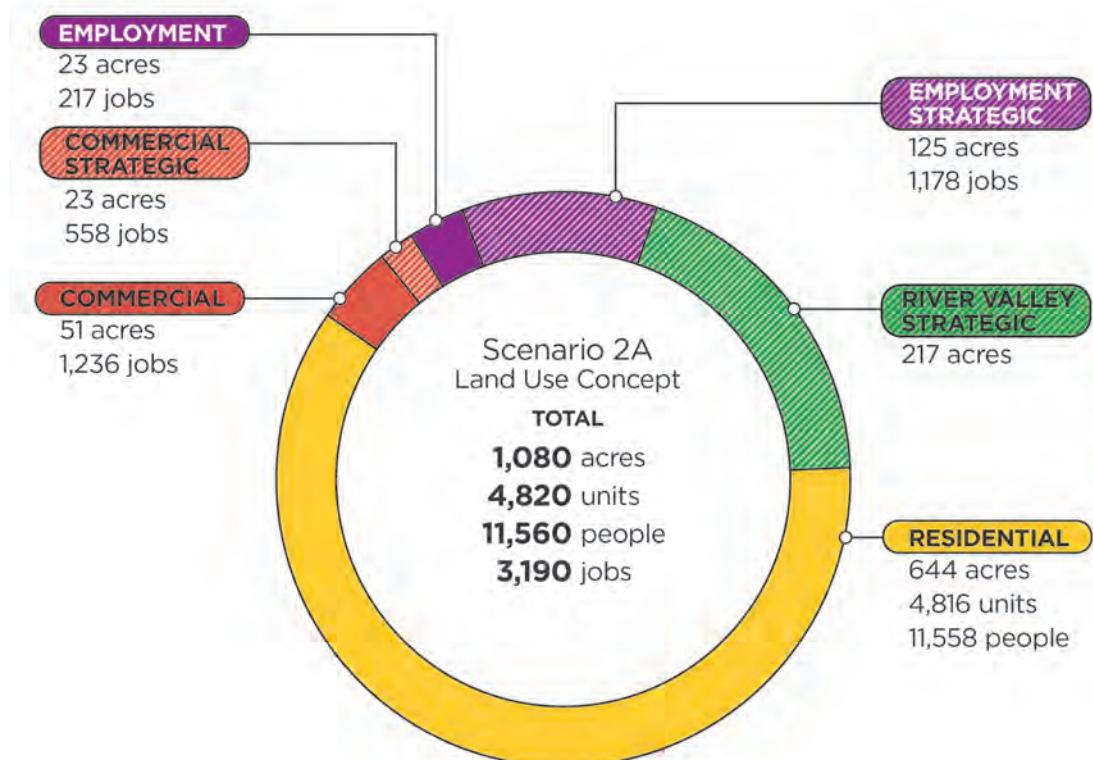
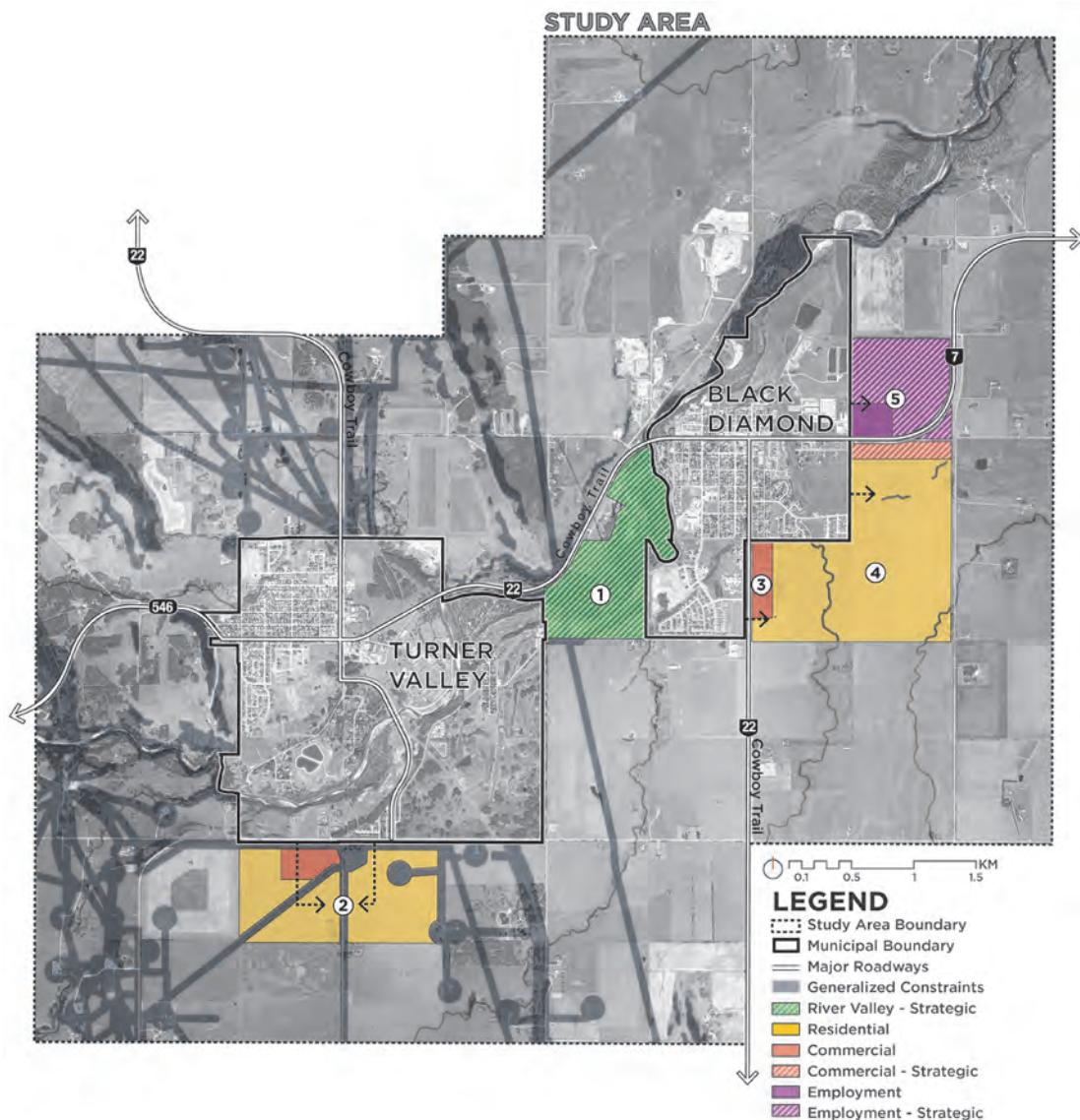


FIGURE 31.
SCENARIO 2A
CONCEPT

This map depicts Scenario 2A's land use concept, highlighting the major ideas as described in the narrative.



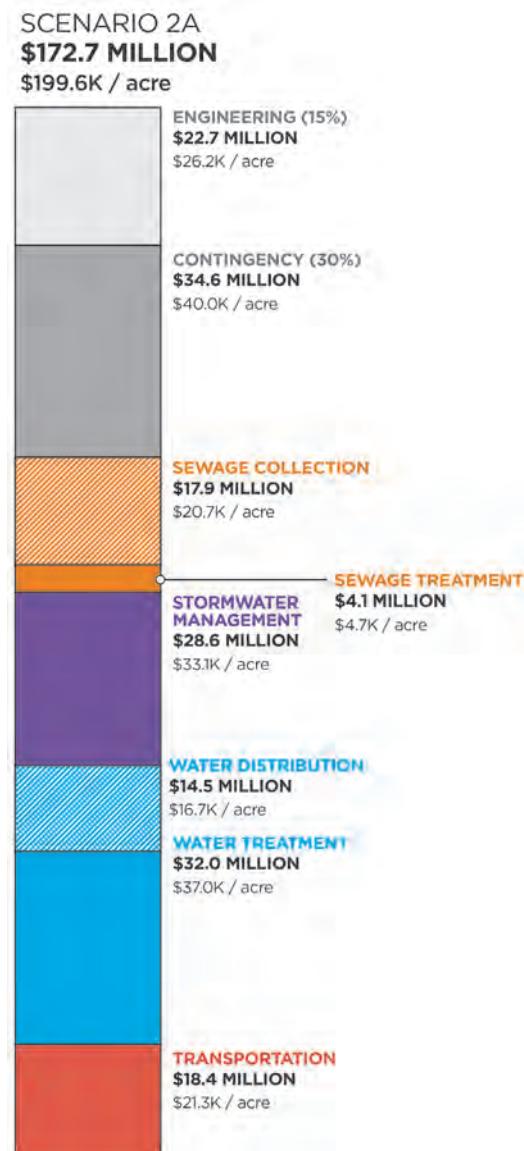
- » Green infrastructure (1) to preserve Sheep River as a major open space connection, excluding the existing country residential development. This area is the connective “green tissue” joining the towns.
- » Logical extension of Turner Valley ASP future development plans in areas (2) that are the least constrained by environmental and development concerns.
- » Provides a new commercial node (3) to service new residential populations, with contingency strategic commercial lands along the south side of Highway 7 that also act as a transition buffer between the employment lands and residential.
- » Locates additional residential development (4) adjacent to existing residential communities, creating continuity.
- » Industrial development (5) along Highway 7 to capitalize on the Highway's access to Highway 2, as well as a continuation of similar uses to create continuity and minimize conflicts.

Infrastructure Servicing

The total infrastructure and servicing cost of Scenario 2A is \$172.7 million (including \$34.6 million as contingency and \$22.7 million for engineering fees). This scenario is the least expensive for total cost of infrastructure investments, but has a total cost per acre - \$199,150 per acre - that is the second most expensive. Refer to Figure 32. Scenario 2A Infrastructure Servicing Costs.

**FIGURE 32.
SCENARIO 2A
INFRASTRUCTURE
SERVICING COSTS**

This figure provides a breakdown of the infrastructure costs associated with the development of Scenario 2A, and the cost per acre.



TRANSPORTATION

The total estimated transportation costs for Scenario 2A are \$18.4 million (\$21,250 per acre of development) (this does not include extra for contingency or engineering fees). However, potential terrain challenges may increase project cost. The estimated magnitude of traffic growth on the existing highways is between 5 and 12. Transportation network investments include the following (refer to Figure 33. Scenario 2A Transportation Concept):

- » 12 (nine existing, three new) intersection improvements along the proposed and existing network.
- » 6.6 km of additional road required to support the growth scenario.

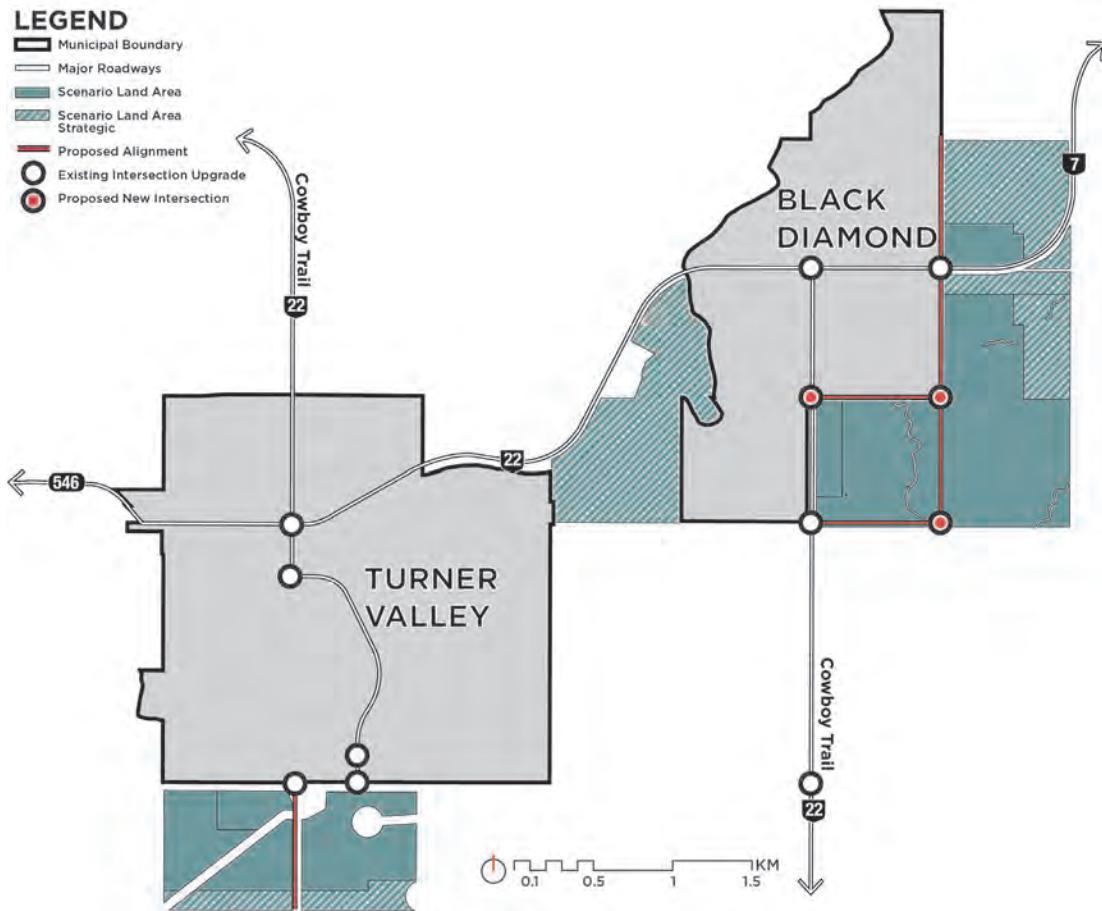
POTABLE WATER

The total estimated potable water costs for Scenario 2A are \$46.5 million (\$53,590 per acre of development) (this does not include extra for contingency or engineering fees). As in all scenarios, it will be necessary to secure sufficient water license capacity and twin of the distribution transmission main from Turner Valley to Black Diamond. Also, there will be a need to upgrade source capacity, the treatment plant, and the pumps in TV Water Treatment Plant to increase flow from Turner Valley to the potable water reservoir in Black Diamond. Additional upgrades include the following (refer to Figure 34. Scenario 2A Potable Water Concept):

- » Reservoir upgrades and an additional reservoir will be required to accommodate an additional storage.
- » Replace reservoir pump station.
- » A new pump station required to boost flow.
- » Two new PRV stations to manage the system pressures.
- » Various distribution mains to loop the system to provide adequate pressure, flow and redundancy.

LEGEND

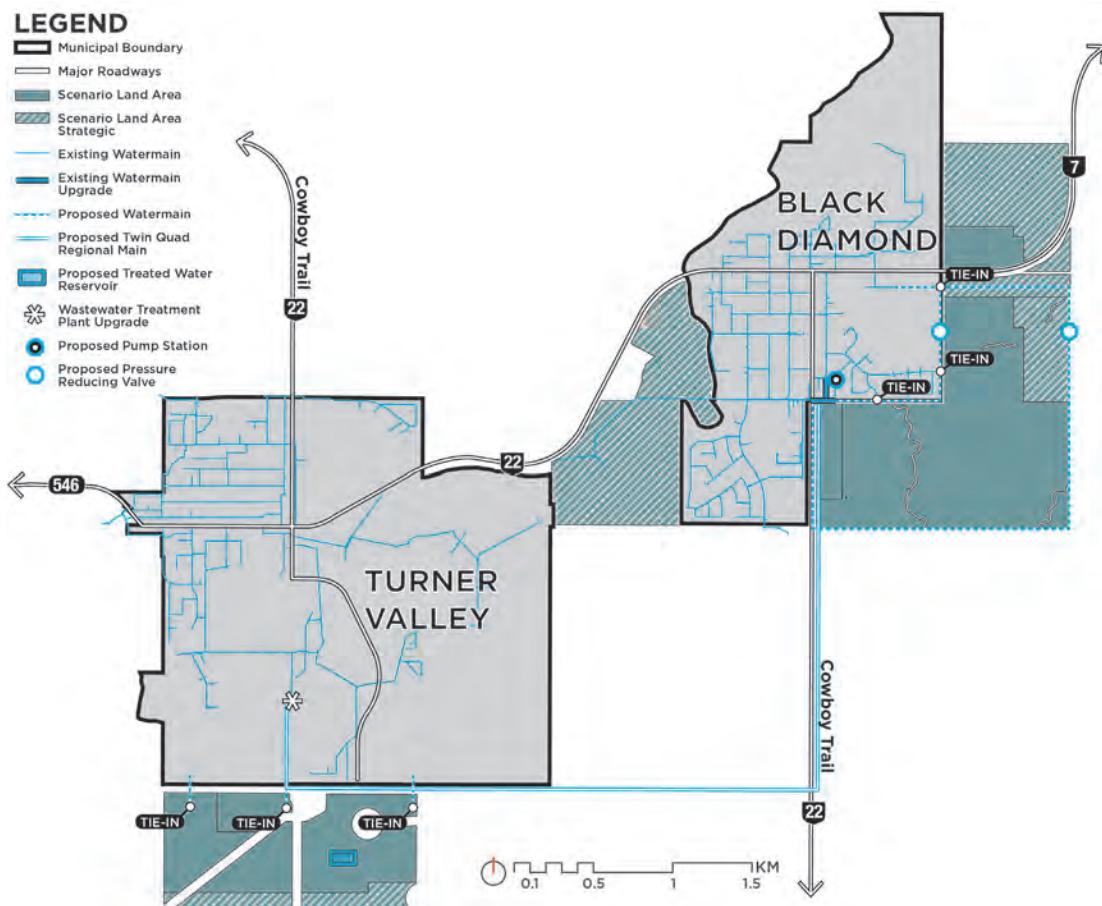
- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Proposed Alignment
- Existing Intersection Upgrade
- Proposed New Intersection

**FIGURE 33.****SCENARIO 2A TRANSPORTATION CONCEPT**

This figure illustrates the transportation concept for Scenario 2A, including a proposed alignment, additional intersections, and intersection upgrades.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Existing Watermain
- Existing Watermain Upgrade
- Proposed Watermain
- Proposed Twin Quad Regional Main
- Proposed Treated Water Reservoir
- Wastewater Treatment Plant Upgrade
- Proposed Pump Station
- Proposed Pressure Reducing Valve

**FIGURE 34.****SCENARIO 2A POTABLE WATER CONCEPT**

This figure illustrates the potable water concept for Scenario 2A, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 2A.

STORMWATER

The total estimated stormwater costs for Scenario 2A are \$17.9 million (\$20,650 per acre of development (this does not include extra for contingency or engineering fees). Based on existing contours, eight catchments, each with a stormwater detention facility, are proposed to attenuate storm flow for Scenario 2A. Stormwater detention facilities will generally discharge into the existing creeks nearby. However, pond drainage routes are as follows (refer to Figure 35. Scenario 2A Stormwater Concept):

- » The north pond will require a drainage ditch and outfall to the Sheep River. These ditches will require drainage easements along adjacent property lines or roads, and may require culverts under secondary highways.
- » The east pond will require a drainage ditch to the adjacent southeast pond, or the creek.
- » The northwest pond will drain west along the existing highway ditch. This may require expanding the ditch.

WASTEWATER

The total estimated wastewater costs for Scenario 2A are \$32.7 million (\$37,660 per acre of development (this does not include extra for contingency or engineering fees). As in all scenarios, wastewater flow from TV will connect into the BD system via the existing Westend Regional Sewage Service Commission (WRSSC) transmission main. However, connections to the south of Turner Valley are not possible due to planned development accounting for existing capacity. Wastewater infrastructure investments for Scenario 2A include the following (refer to Figure 36. Scenario 2A Wastewater Concept):

- » A 375 mm gravity line will carry the flow from the TV/BD boundary and connect into the new Wastewater Treatment Plant.
- » A new effluent outfall will be needed.

Evaluation

The concept for Scenario 2A meets all but one of the Principles. The placement of residential to the south of Turner Valley makes this concept less flexible and less resilient. Not only is the area highly fragmented due to existing oil and gas infrastructure, which will impact the viability and design quality of development, but the development in this direction is also restricted should the town need to grow even more in the future. Furthermore, this concept provides little strategic lands, which limits the towns' ability to adapt and evolve to any change in local and regional growth factors and could result in the need for a second annexation, should the higher growth scenario occur. Another concern of this concept is the addition of commercial to the south of Turner Valley (2). This new commercial node could pose a threat to the vitality of Turner Valley's downtown, by adding a third commercial node for the town and further diluting the draw of each commercial node. Additionally, given its size and position between residential, employment lands, and the highway, the strategic commercial area south of Highway 7 will need careful design consideration, depending on the type of commercial and trip generation.

The concept provides logical extension of residential development in unconstrained, easily serviced, and accessible areas, as well as logical extension of employment lands in areas adjacent to existing industrial with access to Highway 22. However, though this scenario meets the lower range of residential land requirements, it is well below the higher growth forecast, which could pose a challenge should the high growth forecast occur, which is more likely. The drawbacks to this plan are substantial and make this a less favorable option, though it is a thorough exploration of all the options of future development.

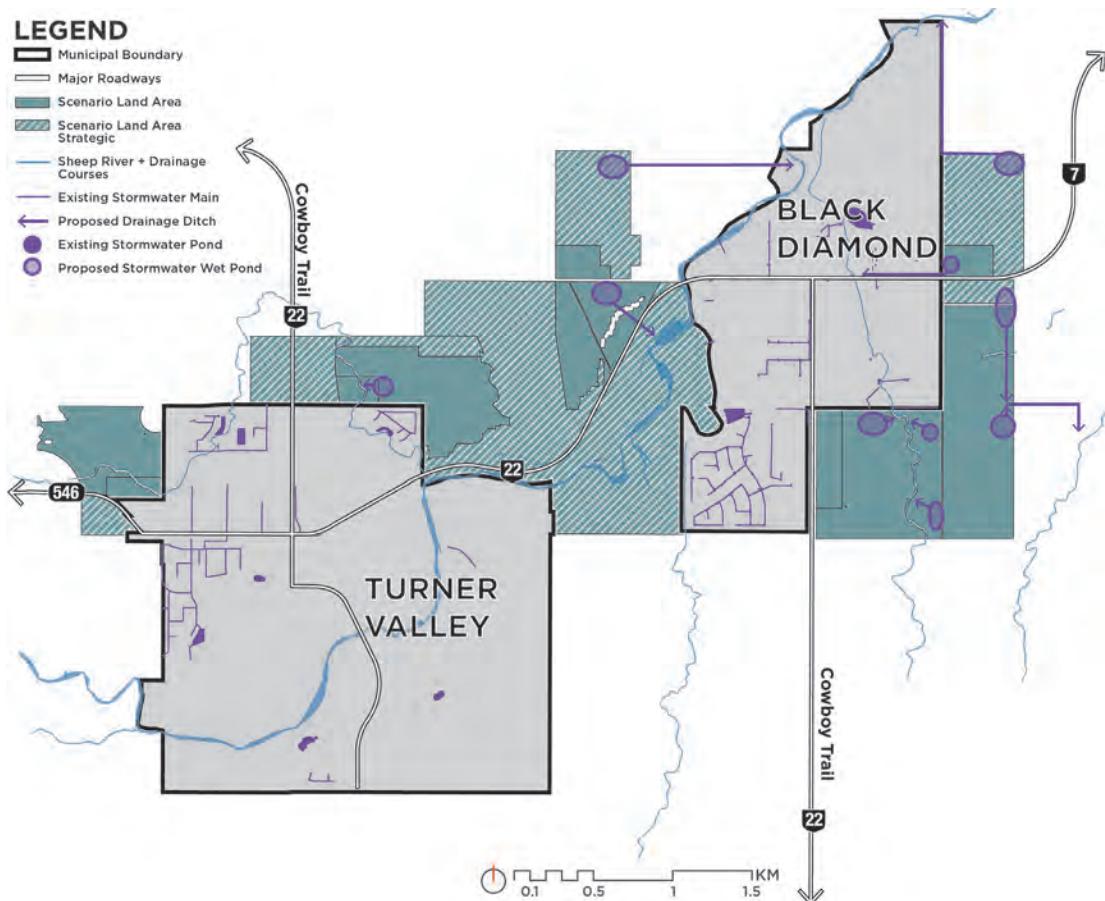


FIGURE 35.
SCENARIO 2A
STORMWATER
CONCEPT

This figure illustrates the stormwater management concept for Scenario 2A, including proposals for additional drainage ditches and stormwater ponds that would be required with the proposed development in Scenario 2A.

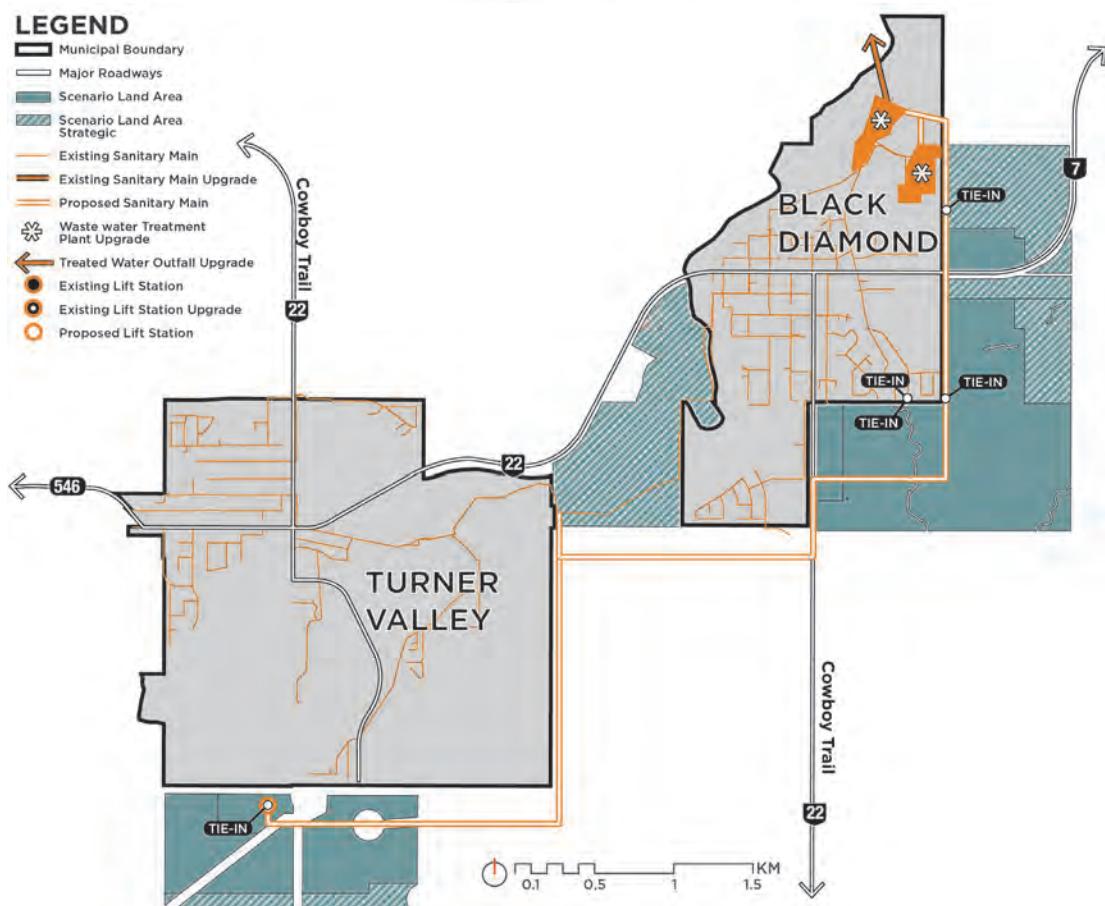


FIGURE 36.
SCENARIO 2A
WASTEWATER
CONCEPT

This figure illustrates the wastewater concept for Scenario 2A, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 2A.

Scenario 2B

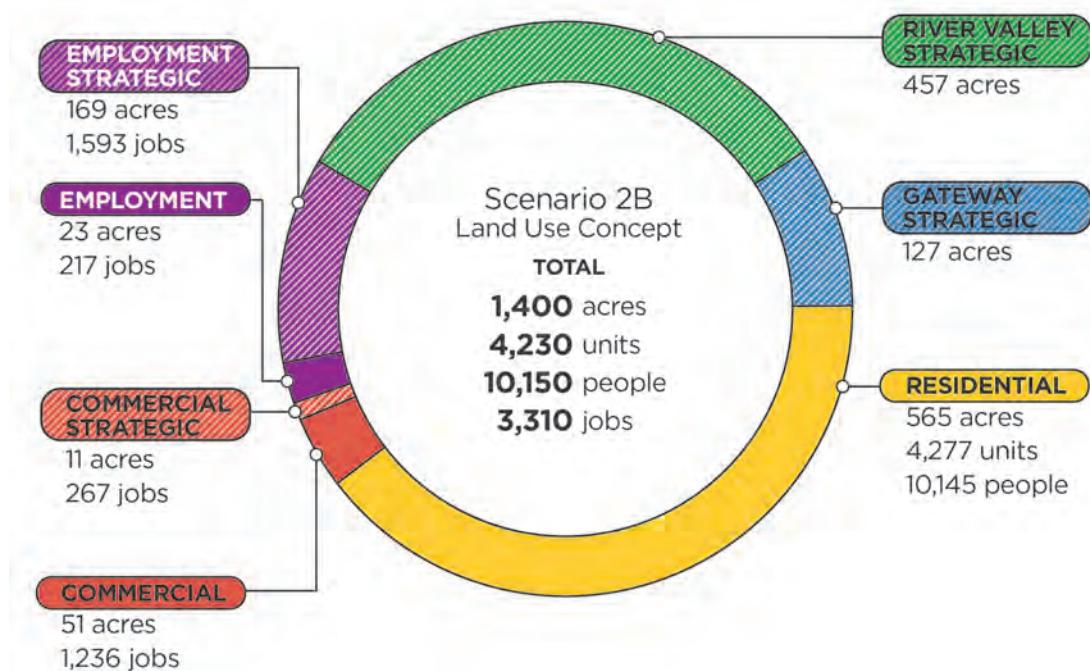
Concept

While growth for Black Diamond in this scenario is fairly similar to Scenario 2A, growth around Turner Valley is significantly different. Instead of growth on the south side of Turner Valley (as is the case in Scenario 2A), Scenario 2B shifts this growth to the north of the town, in the form of smaller, residential growth areas. Additionally, this scenario allows for a more substantial environmental and open space connection between the two towns, covering lands on both sides of the river. Furthermore, this scenario establishes two employment land areas, with the creation of smaller local commercial nodes and strategic gateway areas. In this scenario, growth area lands total 1,400 acres (the equivalent of 8.8 quarter sections), which supports approximately 10,150 people and 3,310 jobs. Refer to Figure 37. Scenario 2B Concept Statistics. The concept for this scenario was based on several key ideas as identified in Figure 38. Scenario 2B Concept, and summarized below.

- » A significantly expanded green network moves across Highway 22 to provide open space connectivity between the towns, as well as the growth to the north, while helping to preserve Sheep River. This area would also absorb the existing country residential development.
- » Residential development builds upon planned communities currently proposed in the MD of Foothills, north of Sheep River.
- » Industrial demand lands split into two areas, one (3) building from the industrial uses currently in the MD of Foothills and one (4) building from the existing Black Diamond industrial development and Highway 7 access.
- » Locates additional residential development (5) adjacent to existing residential communities, creating continuity, however amount is reduced due to the shifted residential to the north, (2) and (7).

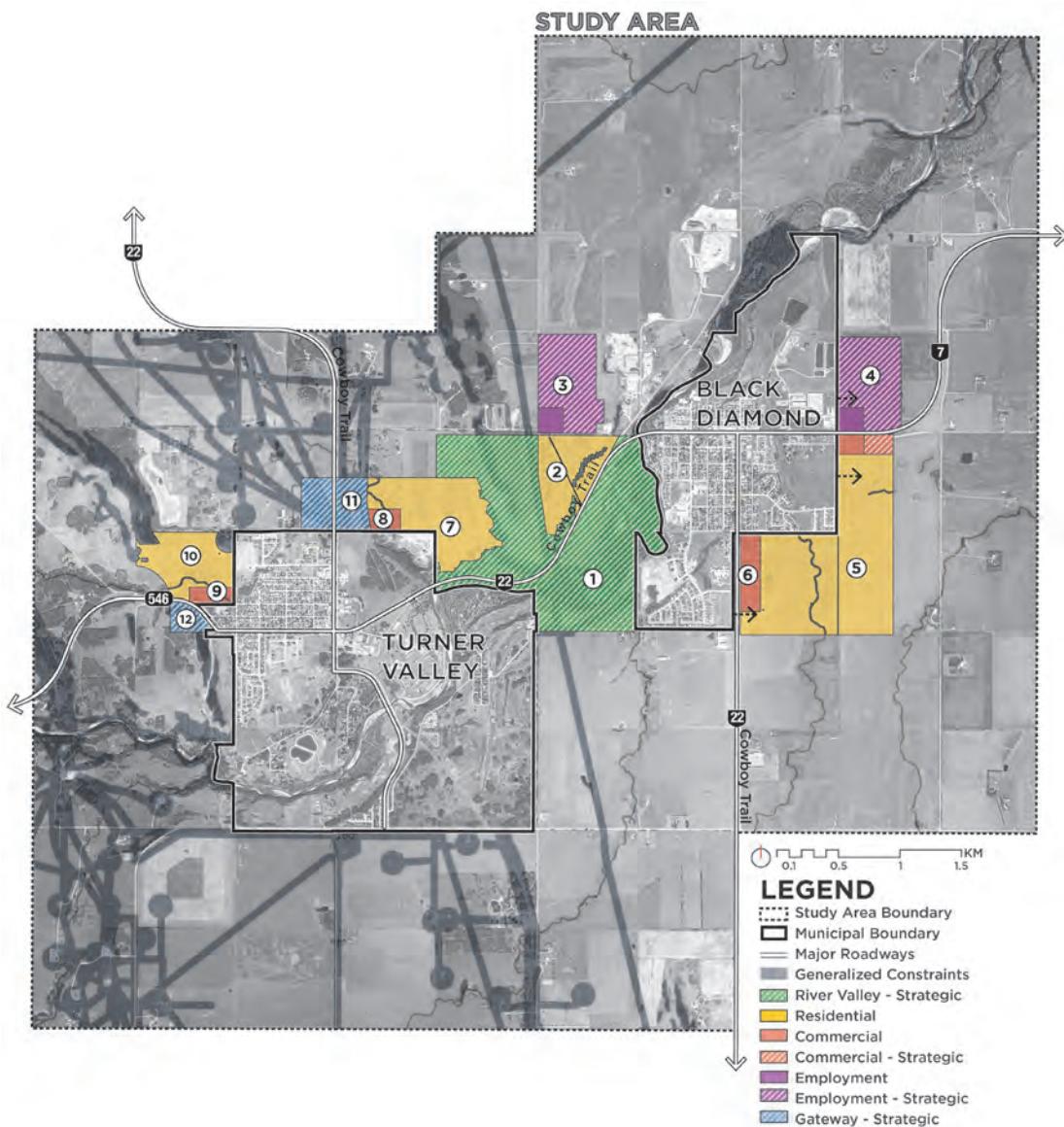
**FIGURE 37.
SCENARIO
2B CONCEPT
STATISTICS**

This chart depicts the acres per land use type for Scenario 2B, as well as their associated population and job estimates.



**FIGURE 38.
SCENARIO 2B
CONCEPT**

This map depicts Scenario 2B's land use concept, highlighting the major ideas as described in the narrative.



- » Provides a new commercial node (6) to service new residential populations, with contingency strategic commercial lands along the south side of Highway 7 that also act as a transition buffer between the employment lands and residential.
- » Turner Valley growth directed to the north and northwest (7) and (10), with (7) exploring the option of unconstrained, stand-alone lands north of existing development, and (10) building off of planned future ASP development as well as existing residential.
- » New commercial nodes (8) and (9) support the expansion of residential development.
- » The important gateway lands and entrance into Turner Valley (11) are highly constrained with no anticipated use, but should these constraints be removed in the future, these areas could be highly valuable for commercial or institutional purpose and should therefore be strategically held.
- » A small extension (12) on the south side of Highway 546 to bring Turner Valley municipal infrastructure into the town boundaries.

Infrastructure Servicing

The total infrastructure and servicing cost of Scenario 2B is \$204.9 million (including \$41.3 million as contingency and \$26.8 million for engineering fees). Both the second most costly for infrastructure investments, this scenario also has the highest total cost per acre, \$249,550 per acre. Refer to Figure 39. Scenario 2B Infrastructure Servicing Costs.

FIGURE 39.
SCENARIO 2B
INFRASTRUCTURE
SERVICING COSTS

This figure provides a breakdown of the infrastructure costs associated with the development of Scenario 2B, and the cost per acre.



TRANSPORTATION

The total estimated transportation costs for Scenario 2B are \$22.0 million (\$26,850 per acre of development) (this does not include extra for contingency or engineering fees). However, potential terrain challenges may increase project cost. The estimated magnitude of traffic growth on the existing highways is between 6 and 11. Transportation network investments include the following (refer to Figure 40. Scenario 2B Transportation Concept):

- » 14 (eight existing, six new) intersection improvements along the proposed and existing network.
- » 8.1 km of additional road required to support the growth scenario.

POTABLE WATER

The total estimated potable water costs for Scenario 2B are \$51.1 million (\$62,240 per acre of development) (this does not include extra for contingency or engineering fees). As in all scenarios, it will be necessary to secure sufficient water license capacity and twin the distribution transmission main from Turner Valley to Black Diamond. There will be a need to upgrade source capacity, the treatment plant, and the pumps in TV Water Treatment Plant to increase flow from Turner Valley to the potable water reservoir in Black Diamond. Additional upgrades include the following (refer to Figure 41. Scenario 2B Potable Water Concept):

- » Reservoir upgrades and an additional reservoir will be required to accommodate an additional storage.
- » Replace reservoir pump station.
- » Upsize the distribution pipe from the reservoir to the distribution system.
- » A new dedicated transmission watermain to carry flow from reservoir across the river.
- » A new booster station to boost flow.
- » One pipeline river crossing to convey from Black Diamond.
- » Various distribution mains to loop the system to provide adequate pressure, flow and redundancy.
- » Four new PRV stations to manage the system pressures.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Proposed Alignment
- Existing Intersection Upgrade
- Proposed New Intersection

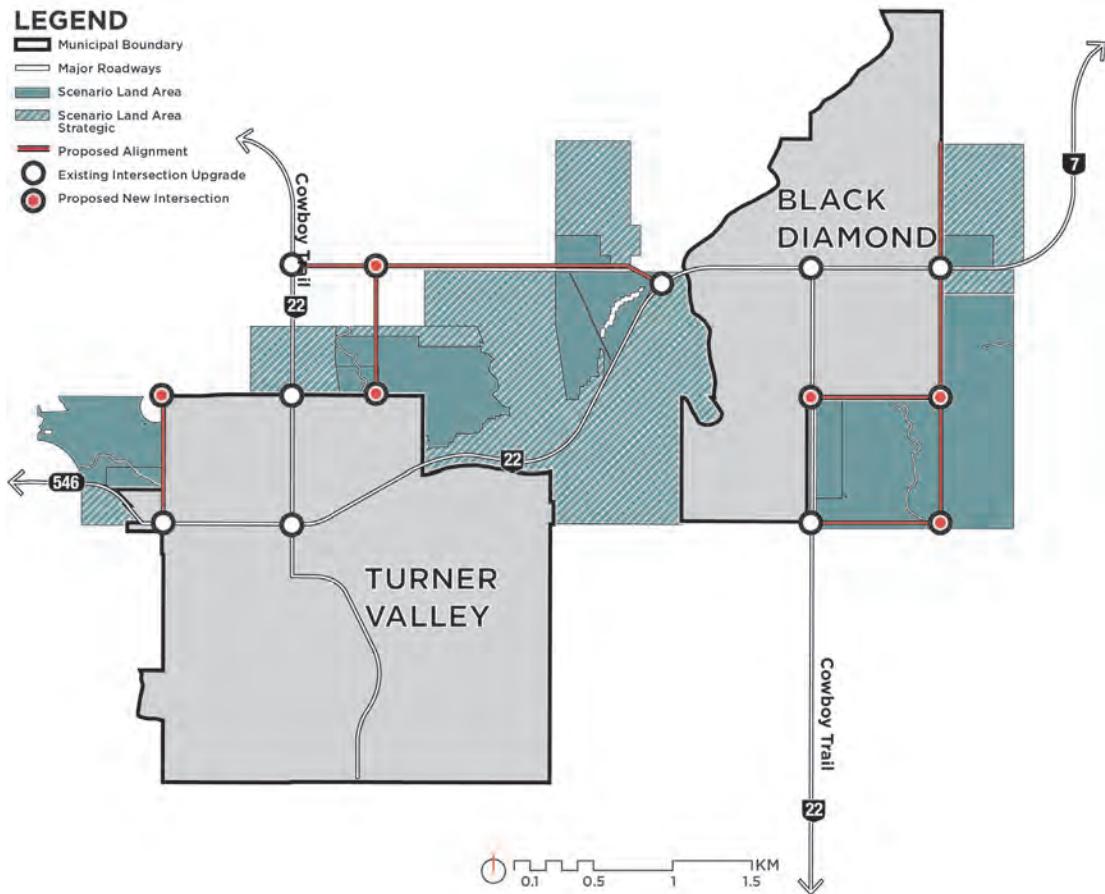


FIGURE 40.
SCENARIO 2B
TRANSPORTATION
CONCEPT

This figure illustrates the transportation concept for Scenario 2B, including a proposed alignment, additional intersections, and intersection upgrades.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Existing Watermain
- Existing Watermain Upgrade
- Proposed Watermain
- Proposed Twin Quad Regional Main
- Proposed Treated Water Reservoir
- Wastewater Treatment Plant Upgrade
- Proposed Pump Station
- Proposed Pressure Reducing Valve

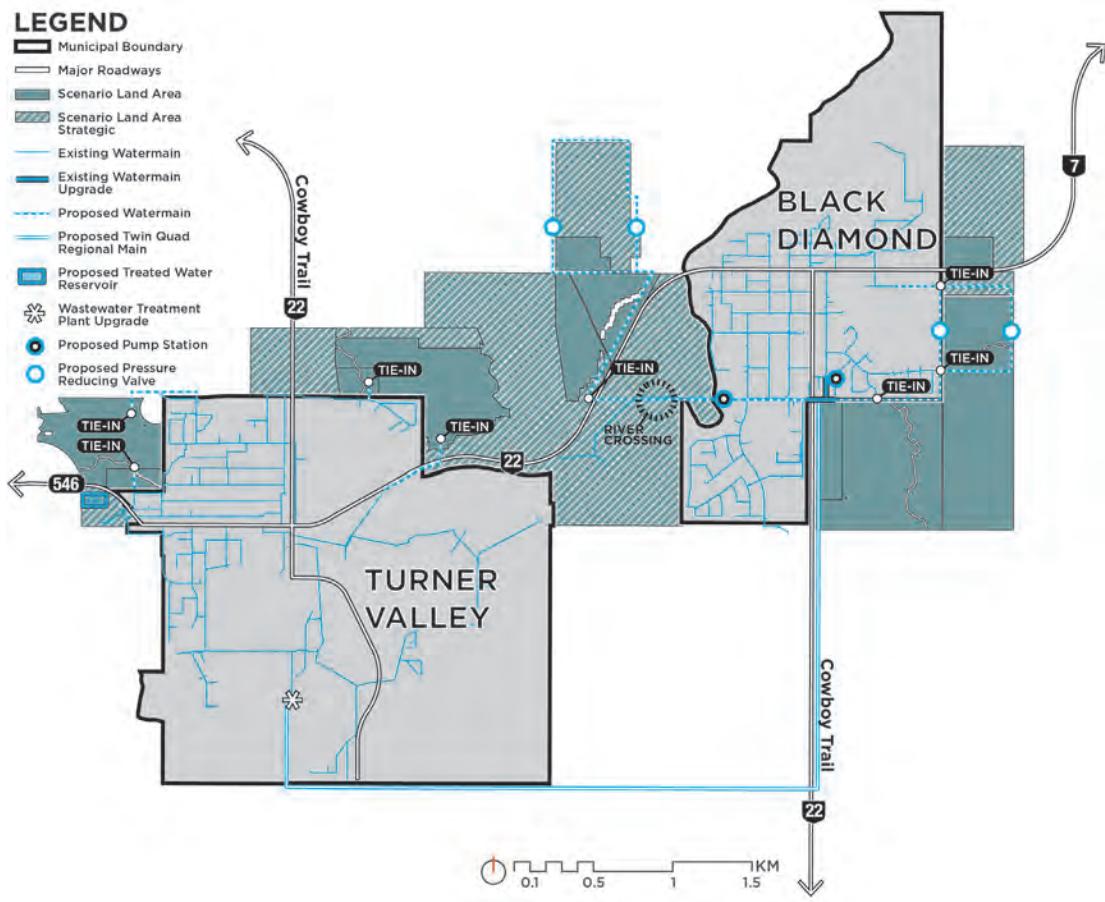


FIGURE 41.
SCENARIO
2B
POTABLE
WATER
CONCEPT

This figure illustrates the potable water concept for Scenario 2B, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 2B.

STORMWATER

The total estimated stormwater costs for Scenario 2B are \$21.1 million (\$25,680 per acre of development (this does not include extra for contingency or engineering fees). Based on existing contours, eleven catchments, each with a stormwater detention facility, are proposed to attenuate storm flow for Scenario 2B. The drainage courses of the additional ponds are as follows (refer to Figure 42. Scenario 2B Stormwater Concept):

- » The south ponds will discharge into the existing creek nearby.
- » Three ponds to the north will require drainage ditches and outfalls to the sheep river. These ditches will require drainage easements along adjacent property lines or roads, and may require culverts under secondary highways.
- » The two ponds to the east will require drainage ditches to the nearby creek. These ditches will require drainage easements along adjacent property lines or roads, and may require culverts under secondary highways.
- » The northwest pond will drain west along the existing highway ditch. This may require expanding the ditch.

WASTEWATER

The total estimated wastewater costs for Scenario 2B are \$42.5 million (\$51,790 per acre of development (this does not include extra for contingency or engineering fees). As in all scenarios, wastewater flow from TV will connect into the BD system via the existing Westend Regional Sewage Service Commission (WRSSC) transmission main. Wastewater infrastructure investments for Scenario 2B include the following (refer to Figure 43. Scenario 2B Wastewater Concept):

- » A new 300 mm gravity line to carry the flow from the TV/BD boundary North and connect into the new Wastewater Treatment Plant.
- » A new 250 mm gravity line to carry flow from under the river to the new Wastewater Treatment Plant.

- » Existing lift station and lines in Turner Valley will require upgrades.
- » A new lift station will be required to service the land north of Turner Valley.
- » A new effluent outfall will be needed.

Evaluation

While a thorough exploration of future development options, the concept for Scenario 2B fails to meet half of the Principles. This concept is not efficient, it has the highest cost for infrastructure servicing and is also comprised of illogical development extensions that create isolated patches of development (2), (3), and (7), and call for annexation of halves of quarter sections. Furthermore, this concept is not sustainable. While it does protect a larger River Valley land area, the isolation of residential communities and developments does not promote economic or social vitality. Finally, this concept is not flexible or resilient. It provides just meets the lower growth land requirements, which could result in the need for a second land annexation, should a higher growth scenario occur, or local or regional growth patterns shift.

Additional challenges for this concept include: additional commercial nodes for Turner Valley that could compete the downtown, a missed opportunity to extend the employment lands (4) along Highway 7 for continued access, the identification of gateway lands (11) that are highly constrained with limited potential for development, and a land use conflict between the adjacent residential (2) and employment land (3) uses to the west of Black Diamond. This concept does provide some benefits, such as controlling both sides of Highway 22 and the entry to Turner Valley with the gateway lands (11) and making use of easily serviced lands for residential development (10) to the northwest of Turner Valley. However, the drawbacks to this concept significantly outweigh the benefits, such that this scenario is a highly infeasible option.

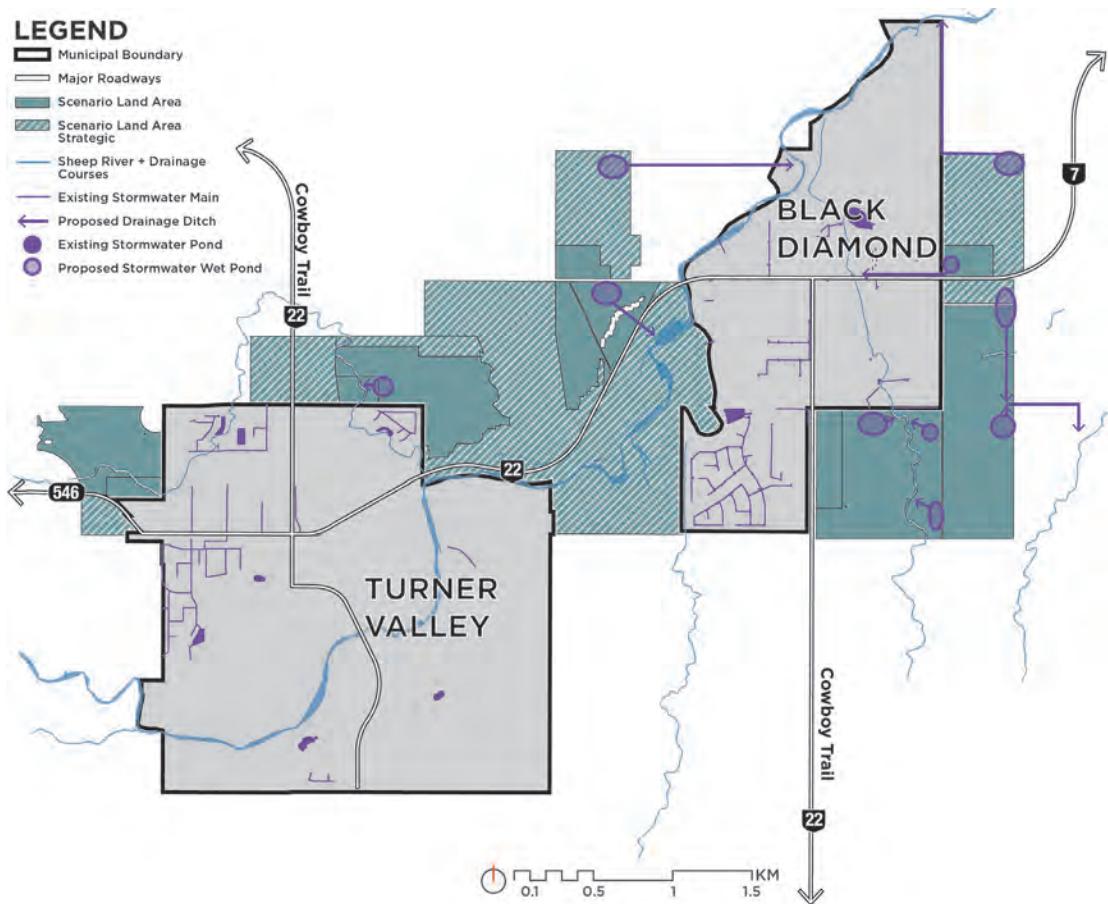


FIGURE 42.
SCENARIO 2B
STORMWATER
CONCEPT

This figure illustrates the stormwater management concept for Scenario 2B, including proposals for additional drainage ditches and stormwater ponds that would be required with the proposed development in Scenario 2B.

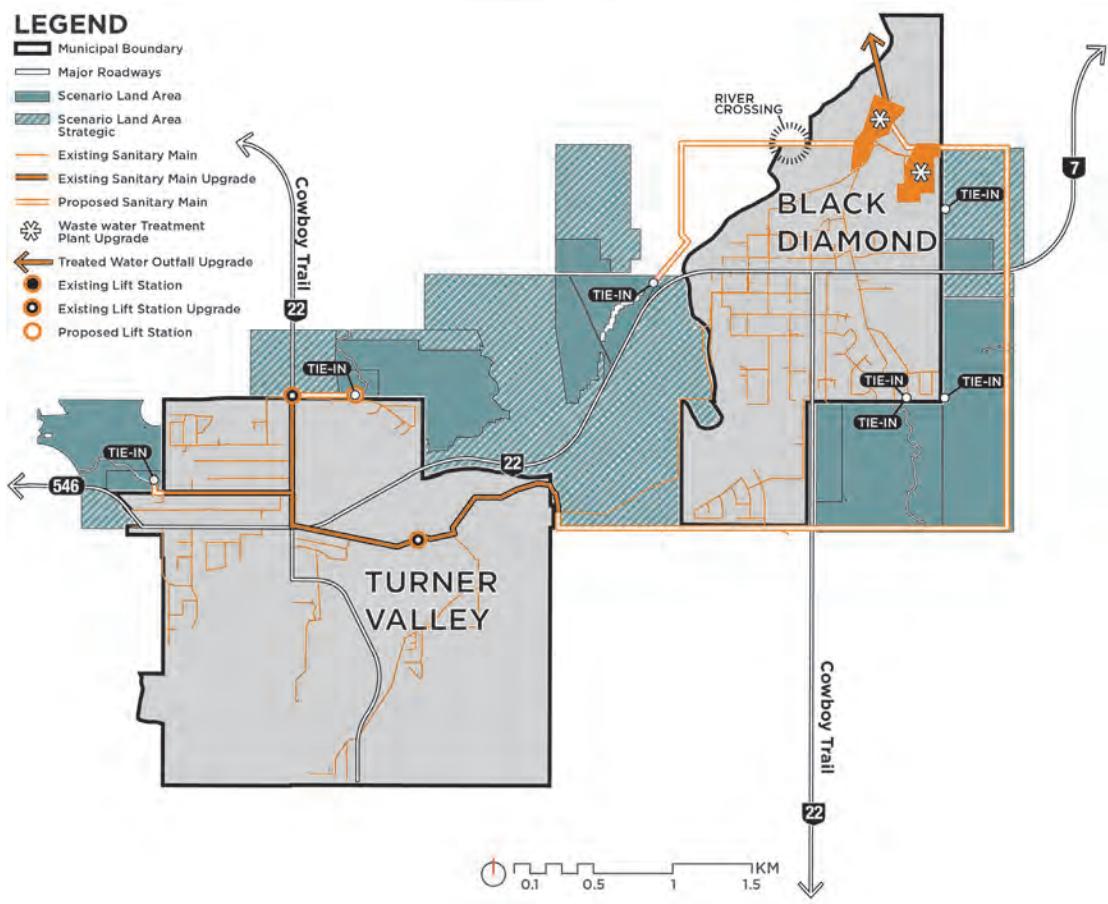


FIGURE 43.
SCENARIO 2B
WASTEWATER
CONCEPT

This figure illustrates the wastewater concept for Scenario 2B, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 2B.

Scenario 3: Joint Advisory Committee Direction

Concept

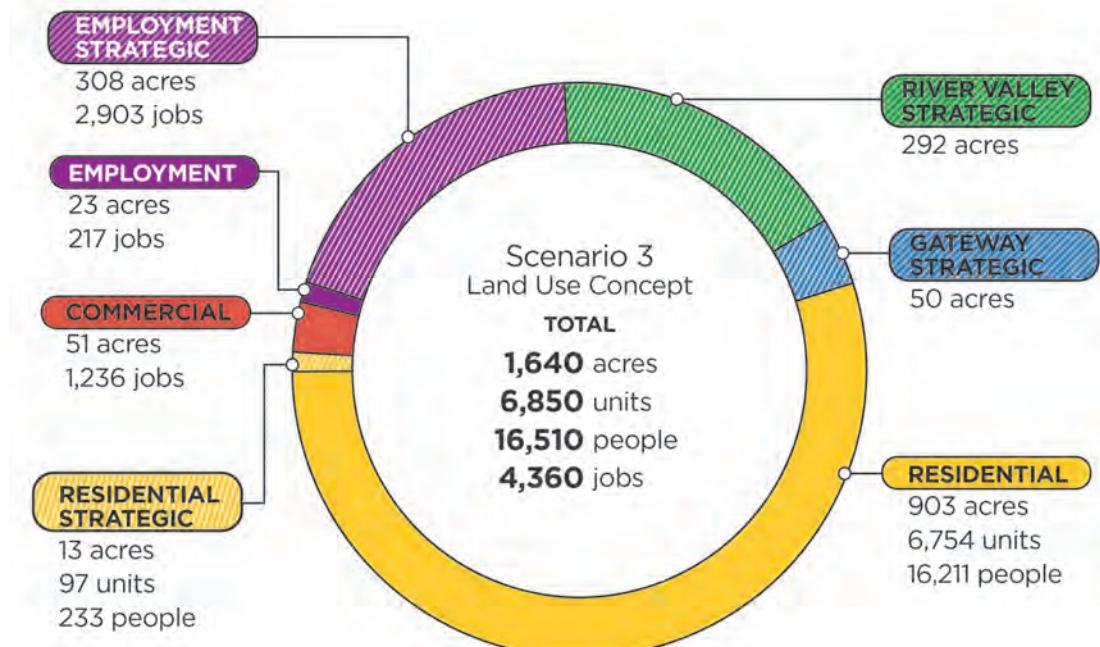
Scenario 3 is based primarily on Scenario 1A, with a strategy of the two towns growing together. However, some elements from Scenario 2B, specially, the location of Turner Valley development, were included in Scenario 3. The concept for Scenario 3 is indistinguishable borders, with expanded River Valley Lands to create an important environmental and open space connection between the towns, while maintaining highway control. The bulk of residential development is concentrated in the area between the two towns, with a new commercial node along Highway 22, and a concentration of employment lands along Highway 7. Additionally, contingency residential and gateway lands have been identified along the northwest border of Turner Valley. In this scenario, growth area lands total 1,640 acres (the equivalent of 10.3 quarter sections), which supports approximately 16,510 people and 4,360 jobs. Refer to Figure 44. Scenario 3 Concept

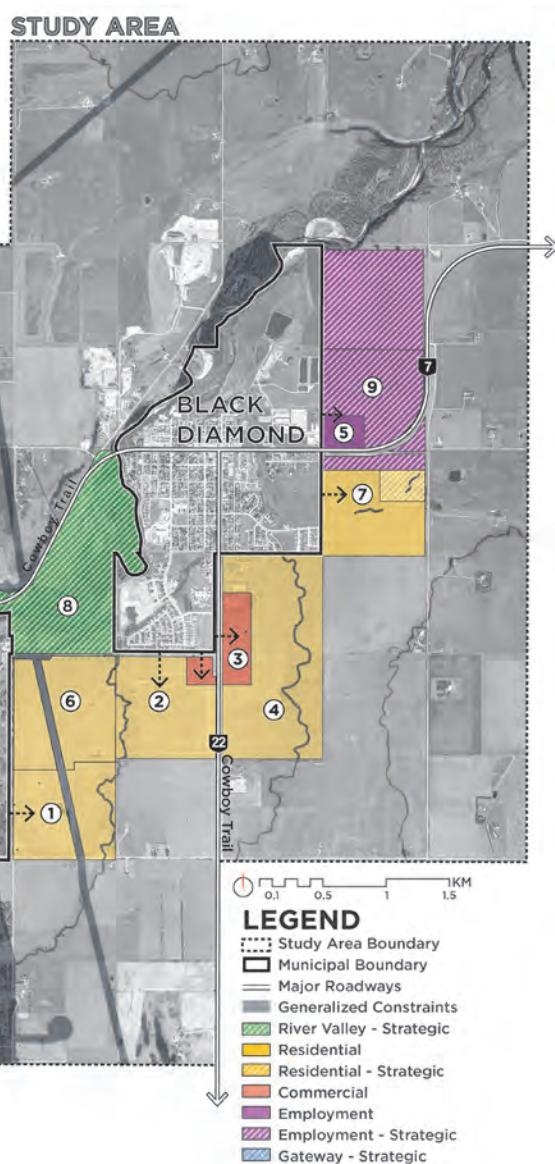
Statistics. The concept for this scenario was based on several key ideas as identified in Figure 45. Scenario 3 Concept, and summarized below.

- » Builds off of the Gateways of Turner Valley ASP to expand residential development west of the town (1), thereby complementing adjacent uses and capitalizing on road network accessibility.
- » Locates additional residential development (2) adjacent to existing residential communities, creating continuity.
- » The continuation of commercial development (3) along Highway 22, making use of existing infrastructure and accessibility.
- » Provides a new commercial node (3) to service new residential populations.
- » A logical extension east and south of Black Diamond in areas (4) that allow for a contiguous town border and development in areas of minimal constraints.
- » Industrial development (5) along Highway 7 to capitalize on the Highway's access to Highway 2.

FIGURE 44.
SCENARIO 3 CONCEPT
STATISTICS

This chart depicts the acres per land use type for Scenario 3, as well as their associated population and job estimates.





**FIGURE 45.
SCENARIO 3
CONCEPT**

This map depicts Scenario 3's land use concept, highlighting the major ideas as described in the narrative.

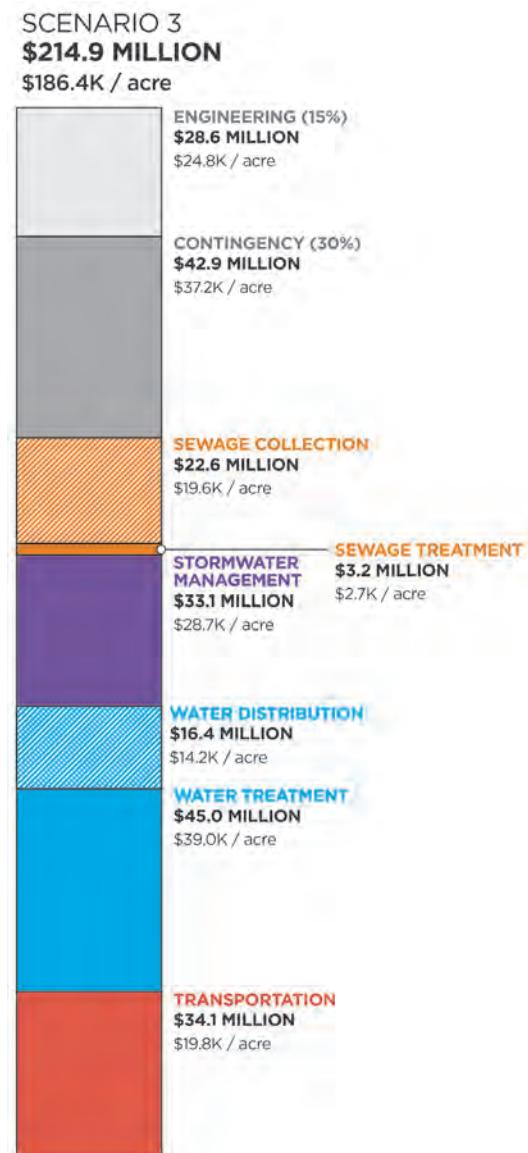
- » A continuation of similar uses (5) to create continuity and minimize conflicts.
- » Allocation of additional residential lands (6) to accommodate the population in the high growth scenario.
- » Residential land (7) on area adjacent to planned Black Diamond residential growth area (Kaiser ASP).
- » Green infrastructure (8) to preserve Sheep River as a major open space connection. In this scenario, this open space area is expanded to the north side of Highway 22 to include Friendship Trail; as a result, the existing country residential is included.
- » Strategic employment lands (9) based on adjacent uses, proximity to Highway 7, and the benefits of flanking Highway 7 on both sides for consistent, dual frontage.
- » As some of the least constrained lands north of Turner Valley (10), this area provides development value as residential land in close proximity to Turner Valley's downtown.
- » Bring municipal infrastructure into the town boundary with a strategic gateway land area (11), as well as strategically hold a potential gateway opportunity (this town entrance is a primary access point to Kananaskis).

Infrastructure Servicing

The total infrastructure and servicing cost of Scenario 3 is \$214.9 million (including \$42.9 million as contingency and \$28.6 million for engineering fees). Note that infrastructure servicing for Scenario 3 does not account for the northernmost quarter section to the east of Black Diamond, as updated estimates were not available at the time of publication. While the most costly for infrastructure investments, this scenario, at \$187,980 per acre, has the lowest total cost per acre. Refer to Figure 46. Scenario 3 Infrastructure Servicing Costs.

**FIGURE 46.
SCENARIO 3
INFRASTRUCTURE
SERVICING COSTS**

This figure provides a breakdown of the infrastructure costs associated with the development of Scenario 3, and the cost per acre.



TRANSPORTATION

The total estimated transportation costs for Scenario 3 are \$22.8 million (\$19,950 per acre of development) (this does not include extra for contingency or engineering fees). The estimated magnitude of traffic growth on the existing highways is between 5 and 18, requiring the widening of four stretches of Highways 7 and 22, and a variety of infrastructure investments. Transportation network investments include the following (refer to Figure 47. Scenario 3 Transportation Concept):

- » 15 (eight existing, seven new) intersection improvements along the proposed and existing network.
- » 8.2 km of additional road required to support the growth scenario.

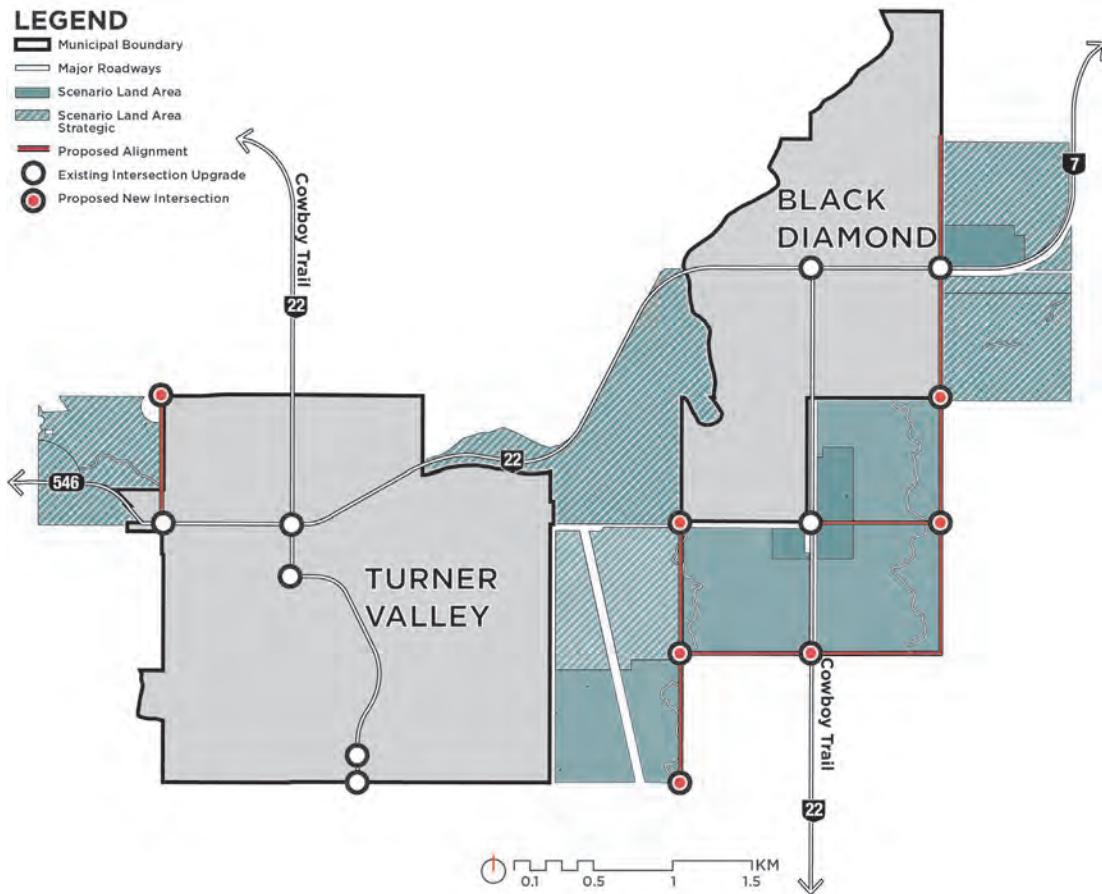
POTABLE WATER

The total estimated potable water costs for Scenario 3 are \$61.4 million (\$53,720 per acre of development) (this does not include extra for contingency or engineering fees). As in all scenarios, it will be necessary to secure sufficient water license capacity and twin of the distribution transmission main from Turner Valley to Black Diamond. Also, there will be a need to upgrade source capacity, the treatment plant, and the pumps in TV Water Treatment Plant to increase flow from Turner Valley to the potable water reservoir in Black Diamond. Additional upgrades include the following (refer to Figure 48. Scenario 3 Potable Water Concept):

- » Reservoir upgrades and an additional reservoir will be required to accommodate an additional storage.
- » Replace reservoir pump station.
- » Upsize the distribution pipe from the reservoir to the distribution system.
- » A new PRV station to manage the system pressures.
- » Add a booster station to increase flow.
- » Provide various distribution mains to loop the system to provide adequate pressure, flow and redundancy.

LEGEND

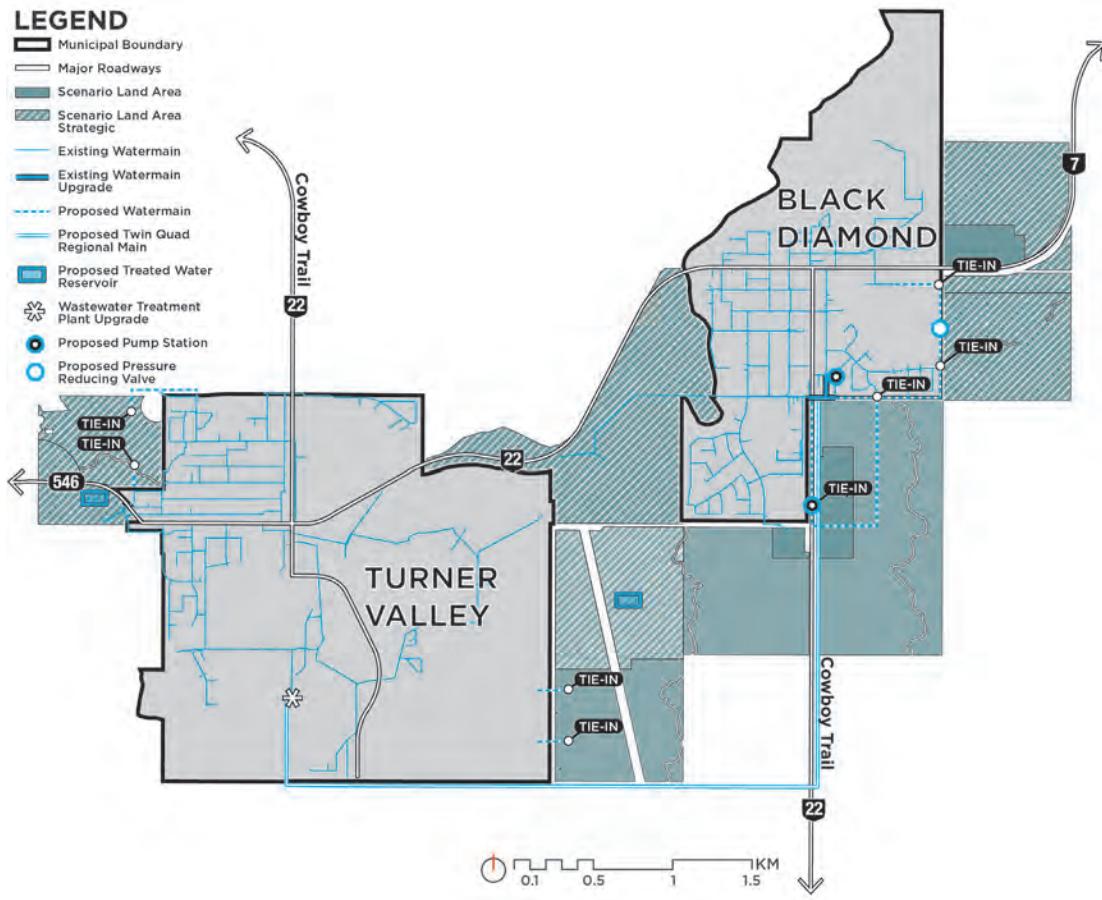
- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Proposed Alignment
- Existing Intersection Upgrade
- Proposed New Intersection

**FIGURE 47.****SCENARIO 3
TRANSPORTATION
CONCEPT**

This figure illustrates the transportation concept for Scenario 3, including a proposed alignment, additional intersections, and intersection upgrades.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Existing Watermain
- Existing Watermain Upgrade
- Proposed Watermain
- Proposed Twin Quad Regional Main
- Proposed Treated Water Reservoir
- Wastewater Treatment Plant Upgrade
- Proposed Pump Station
- Proposed Pressure Reducing Valve

**FIGURE 48.****SCENARIO
3
POTABLE
WATER
CONCEPT**

This figure illustrates the potable water concept for Scenario 3, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 3.

STORMWATER

The total estimated stormwater costs for Scenario 3 are \$22.6 million (\$19,770 per acre of development (this does not include extra for contingency or engineering fees). Based on existing contours, nine catchments, each with a stormwater detention facility, are proposed to attenuate storm flow in this scenario. Stormwater detention facilities will generally discharge into the existing creeks nearby. Additionally, a drainage ditch and an outfall from the north pond to the Sheep River and a ditch from the east pond to the nearby creek will be required. These ditches will require drainage easements along adjacent property lines or roads, and may require culverts under secondary highways. One southwest pond will require a drainage connection to the south pond, or the creek. The northwest pond will drain west along the existing highway ditch (this may require expansion of the ditch). Refer to Figure 49. Scenario 3 Stormwater Concept.

WASTEWATER

The total estimated wastewater costs for Scenario 3 are \$36.3 million (\$31,720 per acre of development (this does not include extra for contingency or engineering fees). As in all scenarios, wastewater flow from TV will connect into the BD system via the existing Westend Regional Sewage Service Commission (WRSSC) transmission main. Additionally, a new Wastewater Treatment Plant will be required to treat the flow to HQ criteria. New infrastructure investments also include: a 400 mm gravity line to carry the flow from the TV/BD boundary to the north, connecting into the new Wastewater Treatment Plant, and a new effluent outfall. Refer to Figure 50. Scenario 3 Wastewater Concept.

Evaluation

The concept for Scenario 3 meets all six of the Principles, by executing several beneficial strategies. This scenario builds from existing land use patterns to create contiguous residential communities, strengthen the existing Highway 22 commercial corridor, provide commercial services to the new residential communities (with the expanded Highway 22 commercial area), and flank both sides of Highway 7 with like uses (employment lands). However, there is the potential conflict between the adjacent residential and employment land uses near Highway 7, which should both areas be fully developed, would need careful planning and design guidance to mitigate this conflict and ensure livability for the community's residents. Similar considerations would need to be given in the IDP for the southern border of the concept along Highway 22 to ensure that development at the major entry is representative of the town and community vision. Finally, the extension of the River Valley lands to the north side of Highway 22 includes the Friendship Trail in the integral open space network, however it also means that the existing country residential development would be incorporated into the towns and would need to be considered for future integration as the towns grow.

The development areas are largely, unconstrained lands areas free from environmental or development concerns and allows for ample strategic residential land to accommodate growth beyond the low growth scenario. Furthermore, the incorporation of strategic gateway land holdings (11) to the northwest of Turner Valley that will strategically gain control of a town entryway. Finally, this is the only scenario that meets the higher growth forecast for residential land requirements. Overall, the concept provides a significant amount of strategic employment lands and residential growth areas, which will aid the towns' adaptability for future changes and reduce the potential need for a second land annexation.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Sheep River + Drainage Courses
- Existing Stormwater Main
- Proposed Drainage Ditch
- Existing Stormwater Pond
- Proposed Stormwater Wet Pond

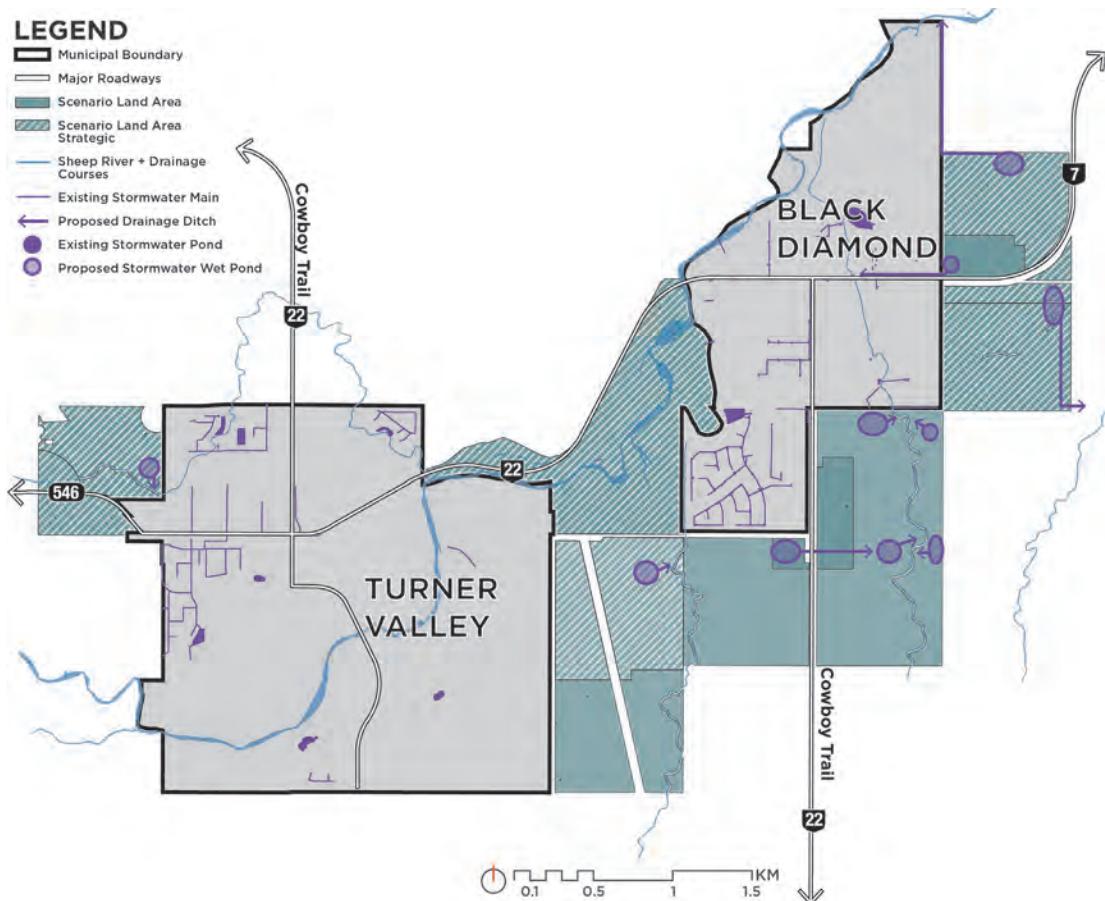


FIGURE 49.
SCENARIO 3
STORMWATER
CONCEPT

This figure illustrates the stormwater management concept for Scenario 3 including proposals for additional drainage ditches and stormwater ponds that would be required with the proposed development in Scenario 3.

LEGEND

- Municipal Boundary
- Major Roadways
- Scenario Land Area
- Scenario Land Area Strategic
- Existing Sanitary Main
- Existing Sanitary Main Upgrade
- Proposed Sanitary Main
- Waste water Treatment Plant Upgrade
- Treated Water Outfall Upgrade
- Existing Lift Station
- Existing Lift Station Upgrade
- Proposed Lift Station

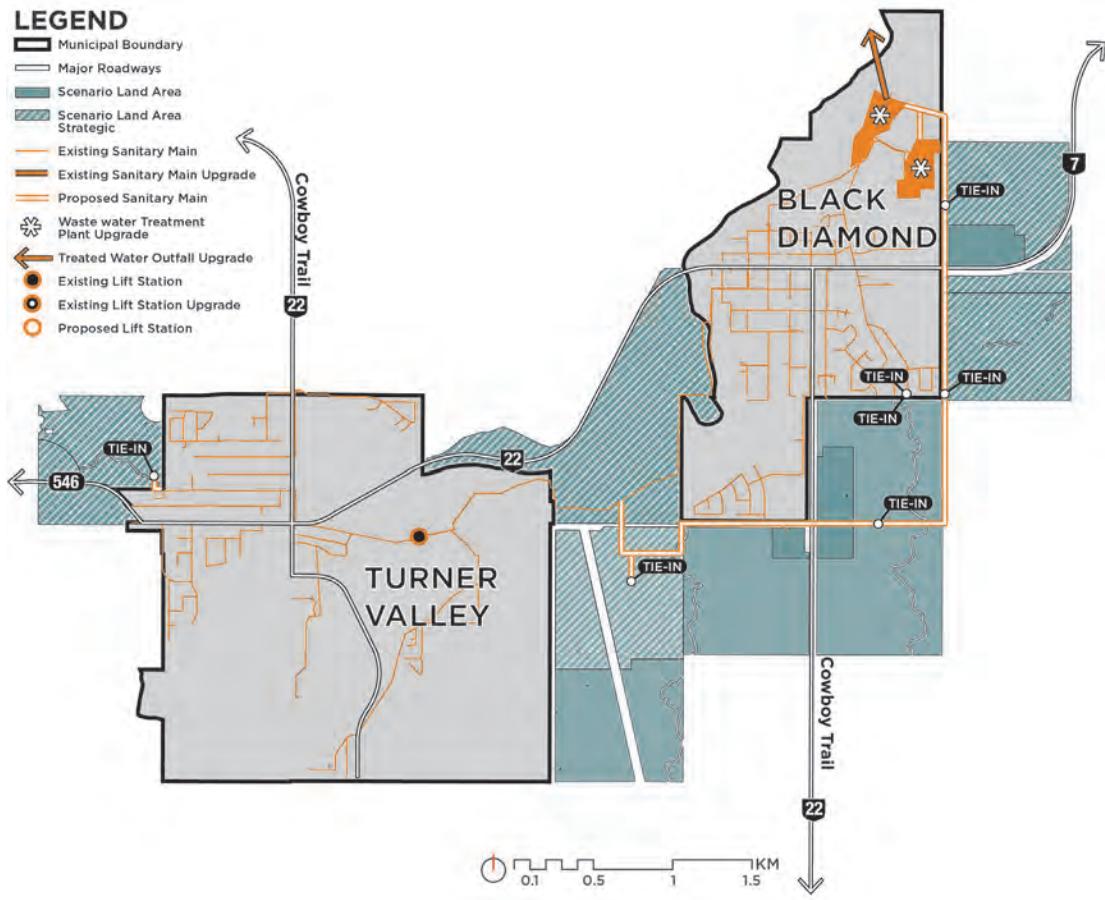


FIGURE 50.
SCENARIO 3
WASTEWATER
CONCEPT

This figure illustrates the wastewater concept for Scenario 3, including proposals for additional servicing infrastructure and upgrades to existing infrastructure, all of which would be required with the proposed development in Scenario 3.

Conclusions

As compromise between Scenarios 1 and 2, and in order to reach the preferable higher growth forecast for residential land, Scenario 3 was ultimately the preferred scenario by the Joint Advisory Committee. Representing the largest additional land area, largely due to additional residential, river valley lands, and strategic employment lands, Scenario 3 represents a vision where the two towns can grow together. The Scenario 3 concept plans for the higher growth forecast in a manner that upholds the Joint Growth Strategy's Vision and

Principles, while also strategically ensuring future flexibility and adaptability of the concept, refer to Figure 51. Comparison of Scenarios: Land Uses. Additionally, while Scenario 3 has the highest cost implications for infrastructure servicing, the cost per acre is significantly the lowest, refer to Figure 52. Comparison of Scenarios: Infrastructure Costs. As the preferred scenario by the Committee, considerations for future growth planning, including phasing and recommendations for next steps, in the following section are for Scenario 3, the preferred scenario.

FIGURE 51.
COMPARISON
OF SCENARIOS
INFRASTRUCTURE
COSTS

This chart compares the total cost of infrastructure servicing to the cost per acre (of development). As a result, while Scenario 3 is the most expensive scenario, it is also the most cost efficient, with the lowest cost per acre.

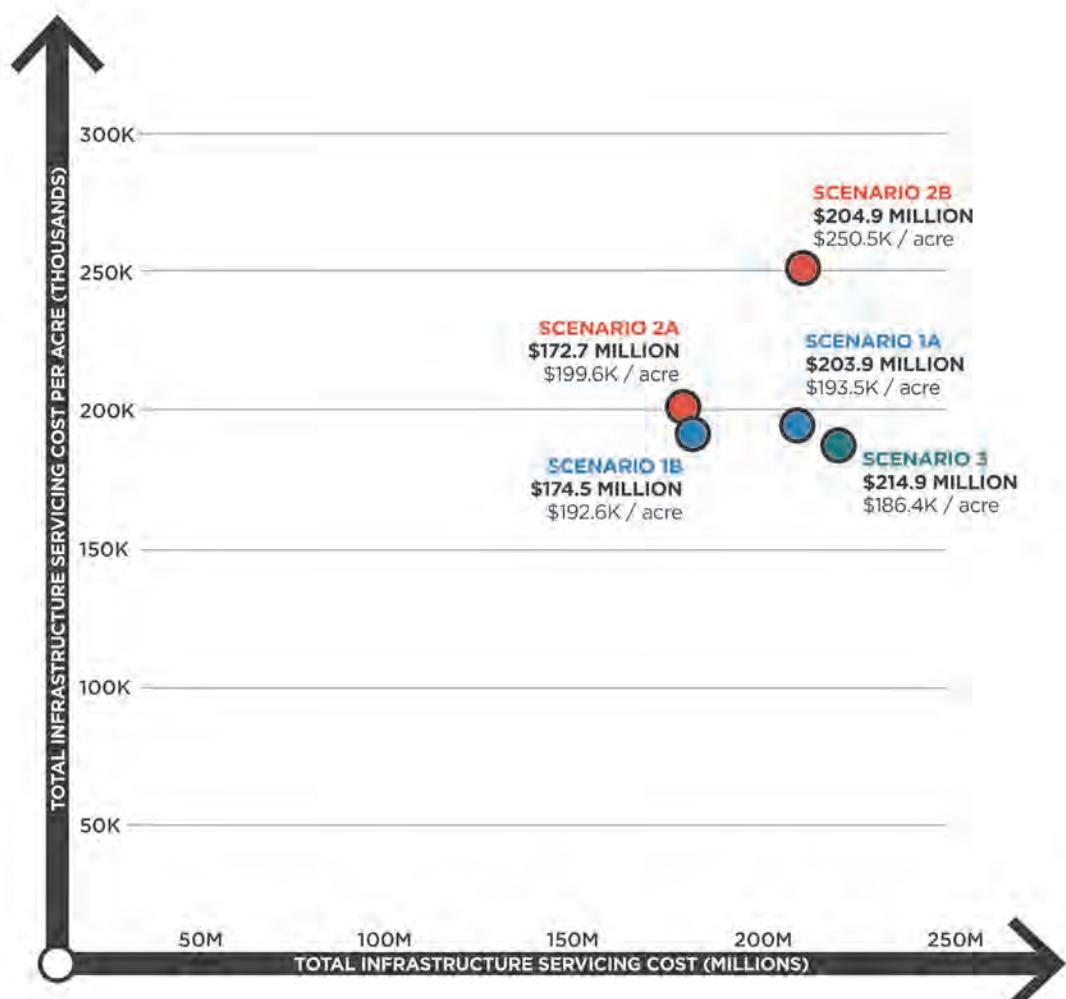




FIGURE 52.
COMPARISON
OF SCENARIOS
LAND USES

These charts provide a summary comparison of the land uses of the three scenarios.



Considerations for Future Growth Planning

Considerations for Future Growth Planning

The final results of this report provide a foundation for future planning efforts to support long-term growth in the Towns of Turner Valley and Black Diamond. Proposed areas for growth, recommended approaches for servicing, and financial impacts should inform future efforts to extend the boundaries of the towns.

The Preferred Scenario

The preferred scenario is a future land use strategy for development over the next 60 years; it's a long-term vision for growth. Therefore, the general identification and understanding of how this growth occurs over the long term is an important

component to the towns' long-term planning. Based primarily on existing servicing capacity, the ease of extensions, and logical alignments and linkages, a general phasing strategy can be outlined for Scenario 3, as follows (refer to Figure 53. Phasing Concept for Scenario 3).

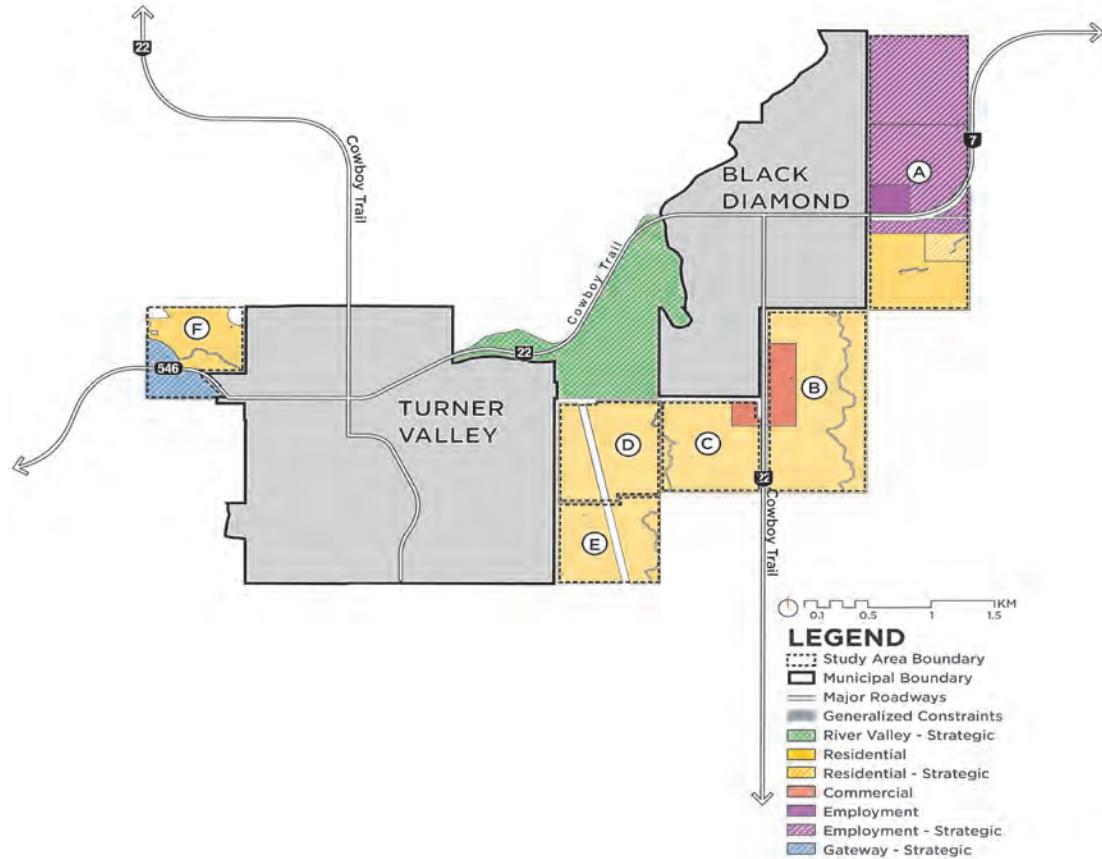
For growth outside of Black Diamond, it is recommended that development should first extend to the three quarter sections to the east (Area A), followed by two quarter sections to the south (Area B), and lastly to a final quarter section to the south (Area C).

For growth outside of Turner Valley, there are two phasing options:

1. If the southeast Turner Valley gateway is not already built, then the quarter section south of Black Diamond (Area C) should be developed first, as all municipal services are accessible within the existing subdivision (in Black Diamond) and can easily be extended south. This quarter section would be

FIGURE 53. PHASING CONCEPT FOR SCENARIO 3

This map depicts the recommended phasing of Scenario 3 development from Turner Valley and Black Diamond, including the two options for Turner Valley.



followed by the area directly to the west of Area C (Area D) and finally the quarter section just south of Area D (Area E) would be developed last.

2. If the southeast Turner Valley gateway is already built, then the north (Area D) and south (Area E) quarter sections can be developed at anytime.

It is important to note, for both options (1 and 2), the development of the strategic gateway area to the northwest of Turner Valley is an independent section (Area F). This area can be developed at anytime as it is not affected by development in Black Diamond and can be connected, relatively easily, to existing servicing. Refer to Appendix D: Scenario 3 Future Growth Phasing for further detail regarding servicing and infrastructure extensions for each quarter section.

Finally, as Turner Valley has significantly more existing capacity for residential development compared to Black Diamond (257.5 acres versus 64.4 acres, respectively), Black Diamond is more likely to extend beyond its town boundaries first.

Future Development Recommendations

The fulfillment of the Joint Growth Strategy Vision will transpire over 60-years, with development of the preferred scenario occurring in phases subject to market demands and the towns' needs. Therefore, in order to uphold the intent of the Joint Growth Strategy's concept and vision for the future of Turner Valley and Black Diamond, it is important that several key planning and design ideas are employed over the next several decades of town planning and development. Based largely on the Calgary Regional Partnership's Greenfield Tool Box, the following key planning and design ideas for future development are intended to help create complete communities with equitable, easy access to parks and open space as well as their daily, local needs.

Create active, vibrant communities and public realm spaces through methods, such as:

- *Complete Streets* increase the capacity of a transportation network by providing a physical environment that facilitates and encourages mobility by all modes of transit: vehicle, transit, bicycle, and foot (refer to The Greenfield Tool Box).
- *Connective Street Pattern Design* addresses the connectivity, safety, and traffic challenges of greenfield street networks, while helping to incorporate public spaces and green infrastructure throughout the site plan (refer to The Greenfield Tool Box).
- *Block and Lot Standards* set a framework for the physical structure and massing of future development and intensification to determine a strategy for integration with the local context and the needs for civic investment in infrastructure and the public realm (refer to The Greenfield Tool Box).
- *Traffic Calming* promotes a more walkable and bikeable community by addressing the impacts of traffic on neighbourhoods (typically in regards to traffic speed) through methods, such as: curb extensions, raised or textured crosswalks / speed bumps, signage, and street trees (refer to The Greenfield Tool Box).

Foster cohesive communities with strong social ties and involvement by:

- Design for the *Neighbourhood Unit* to create synergies among land uses, activate the public realm, and create opportunities for housing and mobility choice, all resulting in a community with a clear place identity (refer to The Greenfield Tool Box).
- Provide opportunities for community involvement throughout planning and design processes to both inform concepts, but also to identify community priorities.

Build sustainable communities by encouraging the following programs and planning techniques:

- *Agricultural Urbanism and Local Food Production* to physically and programmatically integrate a local sustainable food culture and system into the towns' environment and communities, through programs such as: community gardens, farmers markets, farm-to-table start-up, and educational events or school programs (refer to The Greenfield Tool Box).
- *Low Impact Development (LID)* techniques use green infrastructure to reduce the upfront, capital costs of stormwater infrastructure and minimize long-term utility costs, as well as provide spaces for recreational opportunities and improve the overall aesthetic of the built form (refer to The Greenfield Tool Box).
- *Ecological Infrastructure Modeling (EIM)* is used at a regional or sub-regional scale to identify ecologically sensitive areas and thereby guide the design and shape of greenfield site plans (refer to The Greenfield Tool Box).
- *Greenway and Open Space Networks* can be used to define not just the physical framework of a greenfield community but also instill a sense of community identity and character. Additionally, these spaces provide mobility and recreation opportunities, as well as provide habitats for natural systems, while integrating constructed green infrastructure (refer to The Greenfield Tool Box).
- *Xeriscaping* is the careful selection of plant and landscape design to reduce the use of water, fertilizers, and pesticides in gardens, parks, and open spaces (refer to The Greenfield Tool Box).

Next Steps

Following the completion of this study, several key steps are important for the implementation of this shared vision for growth. Future work by the Town and stakeholders should include:

- » **Proceed** with amalgamation process that is currently underway.
- » **Integrate** the two current MDPs (pending amalgamation of the two towns) and align the new MDP with the future land use vision of the Joint Growth Strategy, including recommended annexations and general phasing strategy.
- » **Coordinate** with the MD of Foothills to revise the current Intermunicipal Development Plan (IDP) based on the preferred scenario, and continue with the process for annexation in coordinated efforts with the MD of Foothills.
- » **Consult** the public and stakeholders on future planning and potential development levies. The community should be involved and provided opportunities for comments and feedback regarding future growth planning, particularly in the development of annexation plans and Area Structure Plans. Additionally, to determine the best structure and approach to financing future infrastructure needs, local development interests should also be consulted.
- » **Complete** additional infrastructure studies (transportation, potable water, and wastewater) to coordinate long-term capital planning, and provide more detail to ensure fiscal sustainability.
- » **Develop** Area Structure Plans for newly annexed areas to provide more detailed concepts for growth and guidelines for land development.

Turner Valley +
Black Diamond

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