Conservation Design: linking planning, landscape and ecology

Galloway Lands case study - Fernie, British Columbia

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Purpose

This paper provides a case study of applying Conservation Design principles to the ‘Galloway Lands’ - a large site within the Regional District of East Kootenay.

The purpose is to:

- Provide the policy context for the Official Community Plan’s emphasis on ‘conservation subdivision design’ and application to the Galloway Lands
- Summarize the principles and practice of Conservation Design (CD)
- Confirm the extent to which CD is considered as planning best practice
- Summarize the research interface between CD, landscape, and ecology
- Highlight why CD was likely included in Elk Valley Official Community Plan
- Describe how this approach was applied to the Galloway Lands site
- Outlining potential outcomes of this approach

Background and Scope

The Galloway Lands (‘the Site’) is located within the Regional District of East Kootenay (‘RDEK’). The property is approximately 185 hectares (457 acres) in area. A 74 lot conservation community is proposed. The site is currently the subject of an application for Land-Use Amendment.

Although the Elk Valley Official Community Plan encourages “conservation subdivision“, some have questioned this planning approach and its applicability to the Galloway Lands site.

This paper includes a summary of the REDEK policy context, ‘refresher’ on Conservation Design, overview of current literature and research, recap of the planning process and how the site will be managed in future.

Conventional rural subdivision – no protected areas / no common space

Conservation Design – high percentage of protected areas & common space

Policy Context

All land use planning in British Columbia is guided by a hierarchy of policy plans. The Elk Valley Official Community Plan (OCP) is the region's long-term strategic planning document. It represents the collective vision of the Regional District of East Kootenay.

Some of the overall Goals of the OCP are maintaining '*rural character*' and '*enhanced utilization'* by '*supporting rural subdivision that does not interfere with the future development and expansion of municipalities'*. Other Goals in the OCP mention *'recreational activity'* and *'connectivity'* as well as *'preserving unique ecosystem features such as riparian areas, dry grasslands and sensitive habitat'.*

The Elk Valley OCP therefore focuses on accommodating growth while maintaining rural character, recreational activities, connectivity and conservation. A difficult balancing act - how is this to be achieved?

The OCP is very clear. It goes on to support and recommend Conservation Subdivision Design as its preferred planning approach. It further suggests that rural residential development applications integrate ***'…****the Conservation Subdivision Design provisions outlined in subsection 4.3(1) d."*

This section of the OCP directly refers to the books *'Conservation Design for Subdivisions: A Practical Guide for Creating Open Space Networks (author Randell Arendt) 1996 and The Conservation Subdivision Design Handbook SW Illinois Resource Conservation and Development Inc. 2006.'*

Conservation Subdivision Design is repeatedly mentioned and supported throughout the Official Community Plan. Conservation Subdivision Design, increasingly known as Conservation Design (CD), is a planning tool used to increase land utilization while maintaining rural character, recreation and conservation: precisely the goals of the OCP.

About Conservation Design

Conservation Design ('CD') is an alternative approach to conventional rural development. While new forms of CD are still developing, its most common tool remains through conservation subdivision design. It can best be summarized as: '*An approach to laying out subdivisions so that a significant percentage of buildable uplands is permanently protected in such a manner as to create interconnected networks of conservation lands"* (Randall Arendt 1996)

This planning technique was popularized by Randall Arendt's 1996 book, *Conservation Design for Subdivisions*, followed by *Growing Greener* 1999 and *Rural by Design* 2015). Its foundation, however, was Ian McHarg's famous book *Design With Nature* (1992), which attempted to link ecology and planning. CD also builds on the idea of clustered development or subdivision, which dates to the 1960's. Some historians trace this planning approach still further back to the Garden City Movement of the early 20th century (Clark, 2003).

Conservation Design (CD) is '*among the most commonly used land-use planning tools for conservation' and 'across the Western US 31% of all counties have enacted CD ordinances.* (Miller et al 2009). It has been strongly supported by the American Planning Association for at least twenty-five years. A search on the APA member website ('Conservation + Subdivision') returns 683 results. It has been widely adopted by governments and the planning profession across North America and around the world. This author helped introduce the concept to New Zealand in 1999, where it has since become common planning practice.

At least two Canadian provinces have adopted the CD approach. The Province of Manitoba commissioned a manual for Conservation Subdivision Design (*Managing Change in Rural Manitoba)* in 2014; and New Brunswick has been championing its version ("Sustainable Community Design) since 2006, with numerous built examples.

Many Canadian regional governments have adopted or absorbed CD principles into their plans. Western Canadian examples include Strathcona County (AB), District of Highlands, Victoria (BC) and the Alberni-Clayoquot Regional District (BC). **Appendix A** includes the Alberni Clayoquot Regional District's endorsement of Conservation Design and its benefits to the region.

The Elk Valley Official Community Plan directly references *Conservation Design for Subdivisions* (1996) as a guide and key planning criterion for rural development and land use amendments. This book established both the metrics and a step-by-step process for conservation subdivision design. The planning of the Galloway Lands followed these steps and meets these metrics.

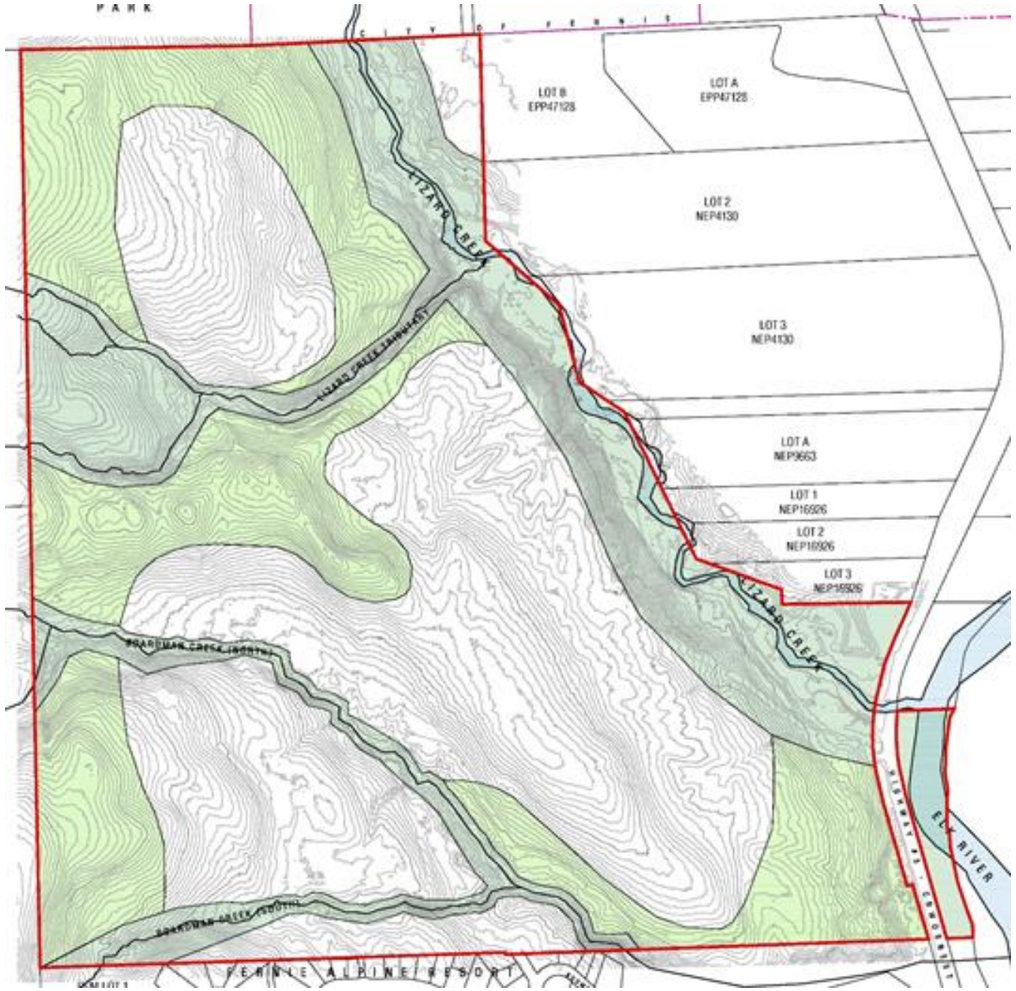
For example, the first step in the CD planning process is to identify Primary and Secondary Conservation Areas.

In the case of the Galloway Lands, initial literature search (Hauer, Locke et al 2016), site modelling and local discussions resulted in the entire valley floor along Lizard Creek being identified as the most important 'primary conservation' area to be protected from development and even trails and pathways. This gravel-bed river floodplain, together with tributary riparian areas and steeper slopes were identified and mapped on a digital terrain model as Primary Conservation Areas.

Additional Secondary Conservation areas were then mapped and added. The remaining CD planning steps: (1) locate homesites, 2) connecting homesites, streets and trails, and 3) delineating lots and boundaries) were carefully followed to ensure that the resulting plan met Conservation Design objectives and criteria.

The resulting masterplan proposes that 51% of the site be rezoned as Park, with a further 19% protected by conservation covenant. A very low density is proposed: 74 homesites on this 185 hectare (457 acre) site. The planning and design process, application of CD principles, resulting masterplan and ongoing conservation mechanisms are described in the detailed Application for Land Use Management submitted to the Regional District of East Kootenay in August 2021.

> ***"Perhaps the greatest strength of Conservation Subdivision Design is the process involved in determining the final layout of the land being developed."***
>
> Strathcona County AB, Appendix A (pg 50)



Galloway Lands

(dark green = primary / pale green = secondary conservation areas)

Literature Research

There is extensive literature re Conservation Design as a planning and land use tool. There is less research, however, into the linkages between Conservation Design and ecology, and the more specific issue of wildlife movement. Lamb (2022) completed a Google Scholar search and found only six results for 'conservation subdivision' + 'large mammal'; and only one paper that included a specific assessment of larger mammals' (deer and elk) movements.

While the migration routes of large mammals are very important, these large, regional-scale land use elements are normally mapped, verified, and included in a Region's Official Community Plan. The publication *Linking Conservation and Land Use Planning* (Michilak and Lenner – Defenders of Wildlife 2006) recommends that wildlife corridors be identified early, as part of high-level regional plans. It suggests that the least effective, most costly and controversial approach is to raise issues late in the planning process for development applications on individual sites (**Appendix B**).

A recent academic paper *entitled Effective corridor width: linking the spatial ecology of wildlife with land use policy* (Ford A. et al – European Journal of Wildlife Research 2020) has also caused controversy by proposing a new concept entitled 'effective corridor width' involving multiple factors. Based on their consolidation of literature and research, the authors recommend "*3,000 to 6,000m for residential areas and 400 to 1,000m for trails'.*

This proposition has major implications for all development, trails and transportation networks throughout the Elk Valley and the region. It clearly requires considerable further study, verification and consideration by the RDEK when the next Elk Valley Official Community Plan is developed. No wildlife corridor has been identified or included in the current Elk Valley OCP that would affect this site.

The proposed site plan includes, however, "*an interconnected network of conservation lands"* (Arendt 1996) including trails. As previously noted, the Lizard Creek riparian area was identified as Primary Conservation Area and set aside early in the process. As stated in the application: "*no part of the property is identified in the OCP as wildlife habitat area…or ungulate winter range".*

Galloway Lands - existing trails

Conservation Design - Benefits and Barriers

Conservation Design is a key part of the Elk Valley Official Community Plan and is encouraged and referenced throughout this statutory document.

The broad consensus among planning professionals, academics and planning agencies is that the CD planning tool has been successful in balancing residential development with conservation; and produces better outcomes than conventional rural subdivision and exurban development.

The objectives of the Conservation Design approach are highly aligned with BC planning legislation, which seeks to create positive environmental, economic and social outcomes for regions, cities and towns.

A scan of the available literature, research and papers suggests the following advantages to Conservation Design relative to other approaches:

Environmental

- Conserves more land in a natural or undeveloped state
- Better protects wildlife habitat and environmentally sensitive areas
- Ongoing management of protected areas through conservation covenants and easements
- Improved ecological connectivity through network of protected areas
- Better supports integrated stormwater management

"Conservation Subdivision Design protects water quality and manages water quality by slowing and filtering stormwater runoff through wetlands, bio-detention facilities and best management practices that maximize soil water infiltration and percolation".

(UNL Water – Institute of Agriculture and Natural Resources)

Social

- Supports and can expand connecting trail and path networks
- Can better support recreational activities (depending on design)
- Creates common, shared spaces and places
- Can enhance social interaction and sense of community

"Without any parks, commons, or community woodlands, there are no informal places where neighbors can easily meet, engage in casual conversation, and gradually become better acquainted with each other."

(Arendt, 1996, p. 6)

Economic and Fiscal

- Generates economic activity and local spending
- Increased local employment (initial and ongoing)
- Creates wider variety of housing choice (vs rural acreages)
- Generates ongoing management and operational investment
- Increases local tax base and municipal revenues

"Conservation subdivisions have fewer impacts on landscapes than the wide dispersal pattern of typical exurban development and have been shown to have more economic benefits than conventional subdivisions."

(Community Planning and Land Use Community of Practice 2019)

These benefits may be the reason that Conservation Design has been so widely adopted by state, provincial, regional, and local governments across North America. In some jurisdictions DC is even 'as of right'.

Appendix A is a publication of the Alberni – Clayoquot Regional District promoting Conservation Design. This plain-English document outlines the benefits (from regional government perspective) and encourages landowners to adopt this approach.

This Region, like RDEK, is facing considerable growth pressures and wishes to maintain its rural character and conservation values.

While design is very important, research suggests that effective conservation must go well beyond this stage. Hostetler & Drake (2009) note that damage to the environment during construction and post-construction must be avoided and mitigated.

Potential and confirmed purchasers should be educated in how to continue conservation efforts on the site. This can be ensured by well-structured conservation covenants and an ongoing management body to oversee ongoing conservation efforts.

Finally, the literature identifies common barriers to CD, and found these to be mainly administrative. If existing local or regional government policy only allows conventional rural subdivision, this can be a major obstacle and the benefits of CD cannot be realized.

By this standard, **the Regional District of East Kootenay has been progressive in supporting Conservation Design through the goals and policies of the Elk River Official Community Plan.**

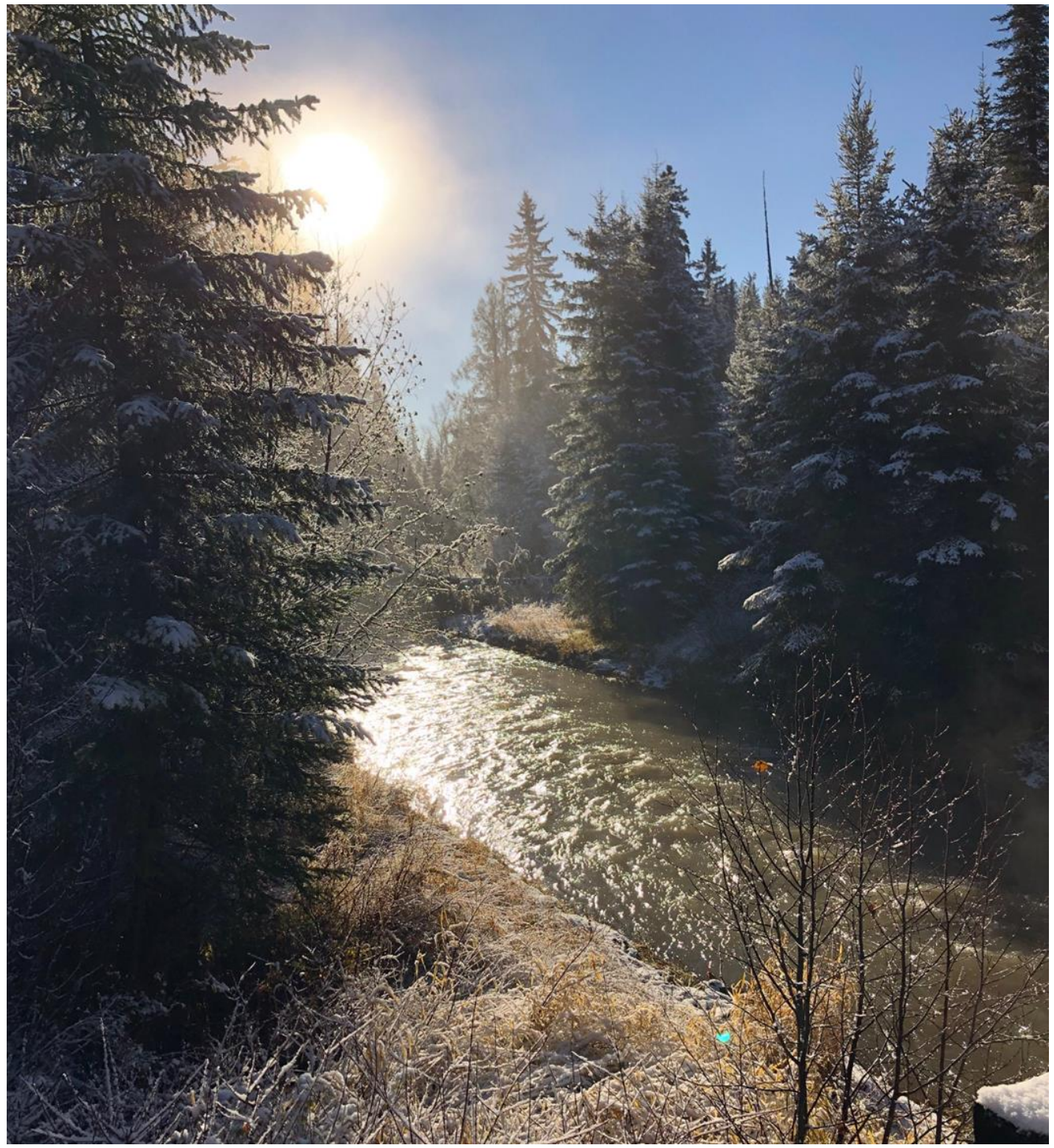
Galloway Lands site (looking west to Lizard Range)

> *"**The challenge** is how to accommodate these newcomers in ways that are sustainable, affordable, economically viable, energy and water efficient, but that also protect rural character, agricultural resources, and the environment.*
>
> ***Conservation subdivisions** are one alternative to traditional development that **local governments may offer to balance the potential influx of new residents with the conservation of open space, scenic vistas, and agricultural lands."***
>
> (Community Planning and Land Use Community of Practice 2019)

Conclusions

The conclusions of this paper are that:

1) **Conservation Design (CD) is widely regarded by the planning profession, other organizations and many governments as a best- practice tool for producing positive environmental, economic, and social outcomes.**
2) **The Regional District of East Kootenay deserves credit for not only encouraging but requiring a Conservation Design approach to rural development and land use applications.**
3) **The Elk Valley Official Community Plan goals include better utilization of rural areas (and further rural development) while protecting rural character, recreational activities, connectivity and conservation.**
4) **The Conservation Design approach (including 'conservation subdivision') was developed specifically to achieve these goals; and has been practiced widely across North America.**
5) **A Conservation Design approach is referenced throughout the OCP and specifically required for land use applications like the Galloway Lands.**
6) **This approach was followed throughout the site analysis, mapping, design, and planning of the site; and is reflected in the detailed Application for Land Use Amendment for the Galloway Lands.**
7) **The major environmental features highlighted in the OCP were mapped, modelled, and protected in the proposed masterplan.**
8) **Ongoing protection and management of conservation values is proposed through a combination of rezoning and ongoing common management through conservation covenants.**



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About the Author

Doug Leighton is a registered professional planner, urban designer, lecturer, and advocate of conservation planning and design. Doug has over 35 years international experience in both the public and private sectors.

He is founder and Principal of EDG (Environmental Design Group), specializing in tourism and conservation planning and design. His academic qualifications include a BA (Honours) Geography and ME.Des (Masters - Environmental Design) from the University of Calgary and further studies at the Banff Centre, Queens and Harvard University (Graduate School of Design). Doug is a Lecturer and Planner in Residence at UCalgary's School of Architecture, Planning, and Landscape, where he teaches spatial planning and urban design.

Conservation has been a constant through Doug's career, starting with an early job as summer Warden for Parks Canada, later his first consulting clients. Conservation was again a key issue in his role as founding Planning Director of Banff's Planning Department in 1990. In 1997 Doug relocated to New Zealand to become Principal of a leading planning and environmental consulting firm (www.boffamiskell.co.nz). His first conference presentation was *Conservation Subdivision Design: Recent NZ Case Studies*. He has since led the planning and design of many conservation projects across New Zealand and North America.

Doug's volunteer roles include serving on the Boards of the BC, Alberta, and New Zealand Planning Institutes; and as Director and later Chair of the Alberta Real Estate Foundation from 2018-2021.

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Appendix A

Conservation Design

Conservation design, or cluster development, refers to the practice of concentrating new development on one part of a property while leaving the remainder largely undisturbed or rehabilitated. It is an alternative to the typical "cookie-cutter" style of subdivision and is beneficial in the protection of environmentally sensitive areas.

Figure 1: Conventional Development Pattern[1]

Under the conservation design method, the first stage of a development application would be a site assessment to determine the portion of the parcel that is most suitable for development.

In a conservation design scenario, the developer would be allowed to concentrate density in areas appropriate for development in exchange for setting aside the remaining land for environmental protection. This would result in the same number of lots, only smaller in size, with less road surface and more public green spaces. This type of subdivision commonly results in higher property values due to the increased green space included in the development.

Figure 2: Subdivision by Conservation Design[1]

Note: Same overall density across the parcel, but smaller lots ensure that environmentally sensitive areas are protected as open space.

How can conservation design be applied in the Alberni-Clayoquot Regional District?

Conservation development in the Regional District is not common. However, the use of conservation design principles for new development could be a great benefit to the Alberni Valley. New development in key areas such as Sproat Lake and along the Somass and Stamp Rivers would see improved environmental protection with cluster development.

With these principles, potential subdivision of farm land across the Regional District would also be less detrimental to agriculture in the Valley. Development is clustered on less productive land while protecting the remainder for active agricultural use.

Sources:
1 - Conservation Subdivision Design Handbook. Southwestern Illinois Resource Conservation & Development Inc. http://www.swircd.org/
2 - Smart Bylaws Guide. West Coast Environmental Law. http://www.wcel.org/
3 - Green Communities Guide. Land Stewardship Centre of Canada. http://www.landstewardship.org/

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Examples of Conservation Design

1. District of Highlands

The District of Highlands, near Victoria, addresses most development applications through unique zoning. An example of this kind of development is the subdivision of a 190 hectare property at Scafe Hill.

Previous zoning on the property would have permitted a subdivision of 15 lots with a minimum lot size of 12 hectares (29.6 acres) and no retained public green space. Due to environmentally sensitive areas and the cost of building roads, spot zoning was brought in to encourage cluster development. As a result, 26 lots were created, averaging 1.5 hectares (3.7 acres), and 145 hectares (358.3 acres) was protected for residents and public use and was added to an adjacent regional park.

The land owners, municipality and a conservation trust also registered joint conservation covenants on the newly created lots in order to protect smaller environmental features. This resulted in approximately 90% of the original property remaining in its natural state.[2]

2. Strathcona County, Alberta

Strathcona County promotes more compact development to lessen the encroachment onto agricultural and environmentally sensitive land.

Deer Mountain Estates was a 53 lot development with a minimum parcel size of 2 hectares (5 acres). Due to the application of conservation design, 43% of the property was preserved as open space. Conservation easements were used to create wildlife corridors around the perimeter of the development and each lot contains a 50m (164 ft) conservation covenant, a legal document requiring vegetation retention. An additional 7.8 hectare (19.2 acre) marsh area was protected as a Public Utility lot.[3]

Advantages of Conservation Design

- Developments are designed to minimize impact on environmentally sensitive areas.
- Protected green space corridors are created, which provide habitat for wildlife.
- Improved storm water filtration through protected watercourse riparian setbacks.
- Protection of agricultural land.
- Vegetation retention acts as a carbon sink by removing CO_2 and other pollutants from the atmosphere.
- Preserves rural character of the area.
- Reduced water usage by creating smaller lots.
- Houses can be sited in areas with the most suitable soils for sewage disposal.
- Maintaining open spaces and public parks can benefit tourism.

- Lower cost to the developer due to less road and utilities infrastructure.
- Higher property values due to protected green spaces and common use parks.
- Provides the opportunity to create public park land at no cost to the taxpayer.

Appendix B – **Linking Conservation and Land Use Planning** (2007) Michalak and Lerner - Defenders of Wildlife)

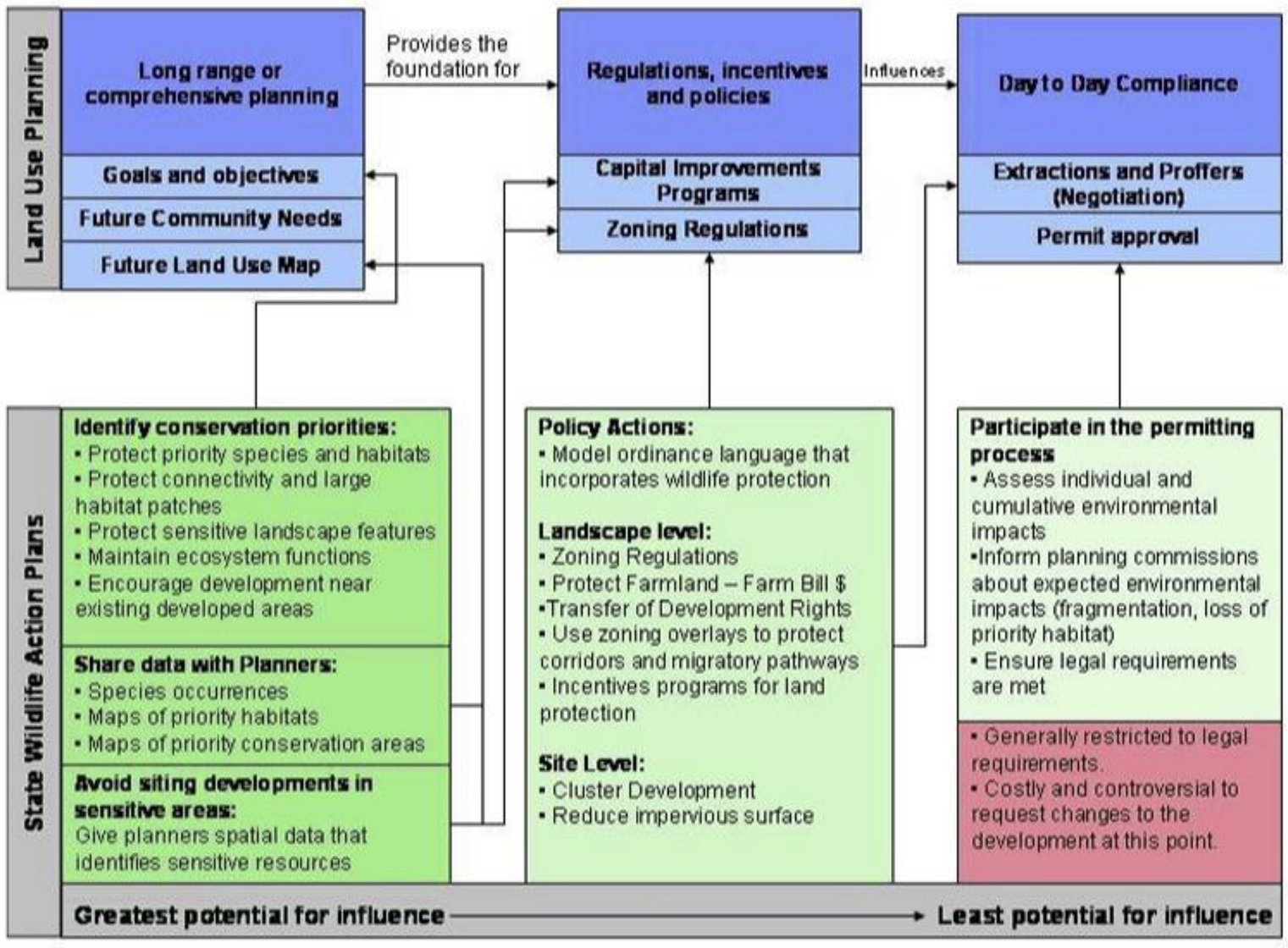

Figure 2: Diagram of the connections between the Action Plans and land use planning