

Sterling Ranch Water Planning Opportunities for Colorado

Integrating Water Conservation and Water Quality into Land Use Planning

Rocky Mountain Land Use Institute
March 2012



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Land Development In A New Economy

□ Housing needs

- Generations X/Y entering the market, baby boomers retiring
- Both Need A Home – Different Than The Past
- Large Non-Traditional Buyer Market
- Sustainability Is Important if Not Too Expensive

□ Historical underinvestment in infrastructure

- Replacing Water Infrastructure at .5% per year
- Douglas County's Transition to Renewable Water

□ Growing economy and private capital will have to solve the problem



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Douglas County Leads by Example

“The State should investigate and discuss how to assist local governments to revise their land use regulations to encourage and provide incentives so that new development will be designed to use less water and to conserve water.”

– Interbasin Compact Committee 2010 Report to Governor



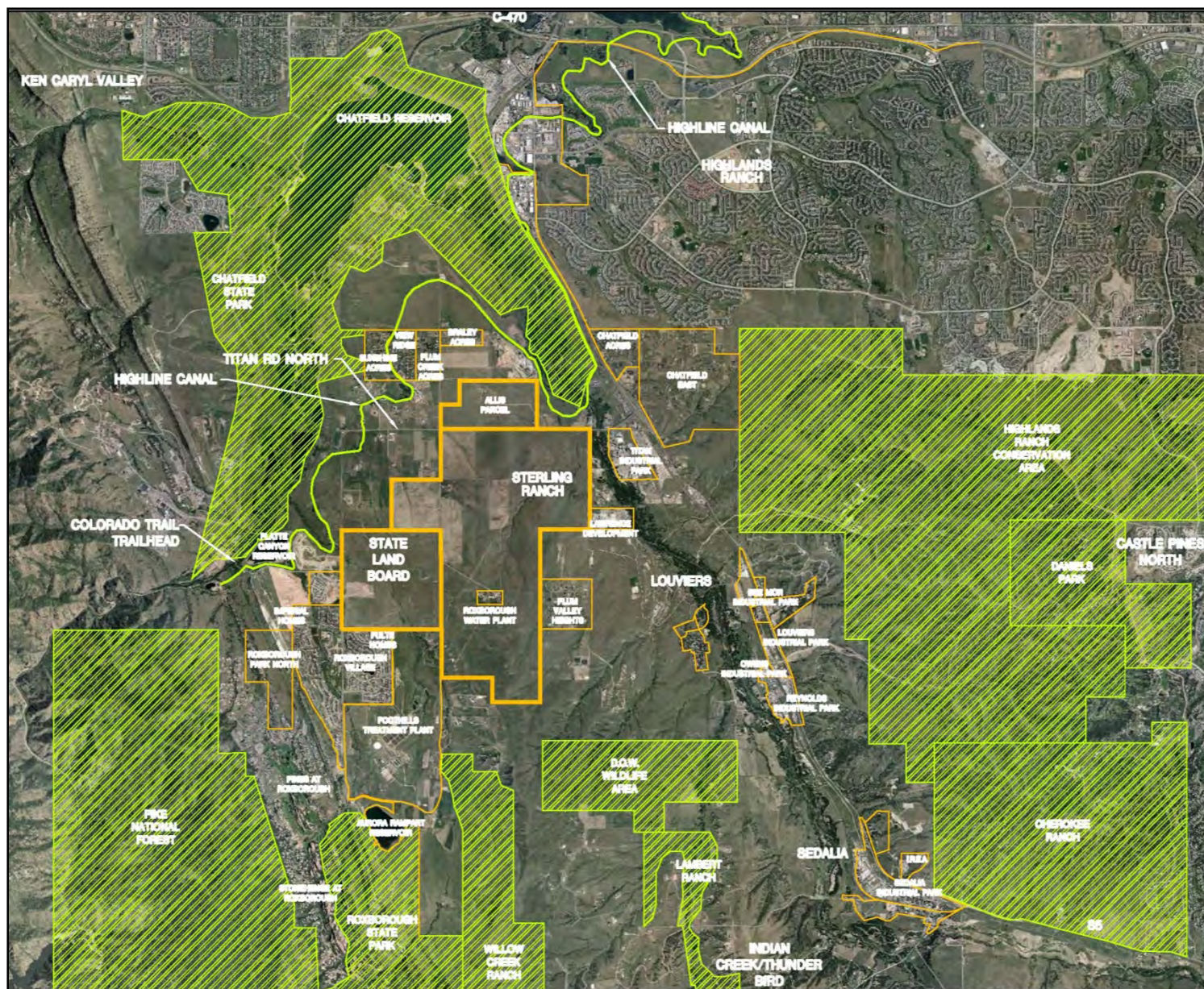
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Overview of Sterling Ranch Project

- ❑ Sterling Ranch, LLC, A Family Business
- ❑ 10 Years in the Making
- ❑ Total Project Approximately 3,450 Acres
 - Key strategic location
 - An infill Site
 - Offering an Outdoor Life Style and Quality of Life
- ❑ Focused on the “First and Last” Home Markets
- ❑ Zoned May of 2011 for 12,050 homes and 2,000,000 square feet commercial
- ❑ 37% open space with 30 miles of trails



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Our Strategy – Create a Water System

- ❑ Dominion Water & Sanitation District
 - County's only wholesale district, Only serving other districts and municipalities
 - Regional commitment and perspective
 - New tap fees fund infrastructure
- ❑ Building a Water System
 - Based Upon Demand Reduction – Conservation
 - Multiple Water Sources and Options
 - Waste Water/Stream Nutrient Loading is a Defining Factor – More So Each Day



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Sterling Ranch Water Strategy

Water supplies: extremely limited.

Demand management: a viable method.

❑ Holistic Approach To Demand Reduction:

- Reduce in-home demand,
- Manage landscape irrigation use,
- Use naturally occurring water effectively.

❑ CWCB Study provided data and public understanding:

- *Holistic Approach to Sustainable Water Management in Northwest Douglas County*
- Download www.lrewater.com



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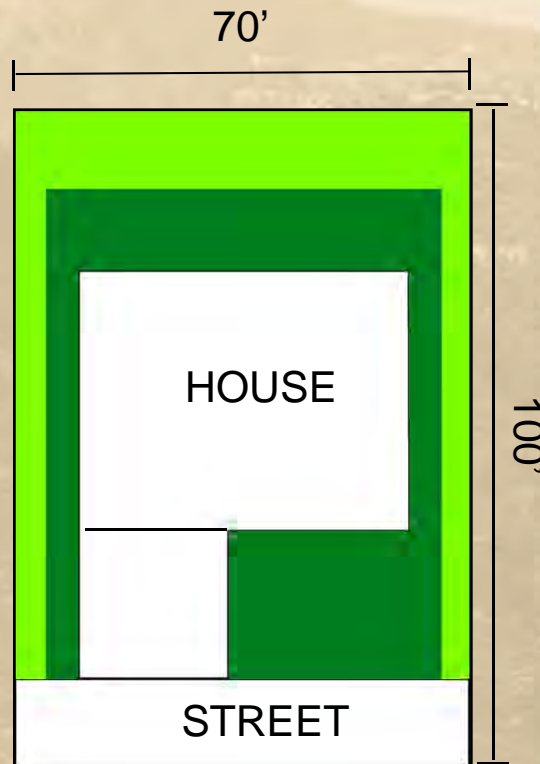
Demand Alternatives

Traditional Landscaping

Total Irrigation Area = 50.2% of Lot

Irrigated Area (Sq-Ft)

○	Impervious	3,470
●	Turf	2,000
●	Planting	1,500
●	Non Irrigated	0
●	Total Lot	6,970



Annual Demand (Acre-Feet)

Domestic = 0.30

Irrigation = 0.35

Total = 0.65



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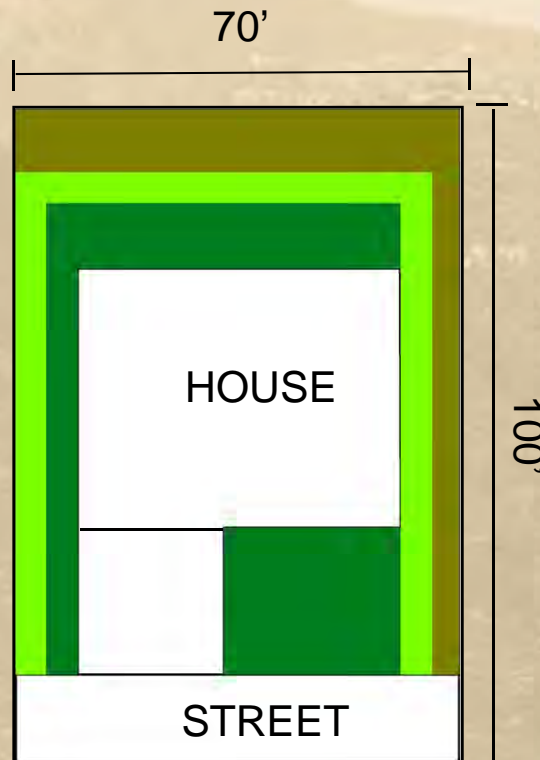
Demand Alternatives

Moderate Conservation Landscaping

Total Irrigation Area = 35.8% of Lot

Irrigated Area (Sq-Ft)

<input type="radio"/>	Impervious	3,470
<input checked="" type="radio"/>	Turf	1,500
<input type="radio"/>	Planting	1,000
<input type="radio"/>	Non Irrigated	1,000
Total Lot		6,970



Annual Demand (Acre-Feet)

Domestic = 0.30

Irrigation = 0.16

Total = 0.46



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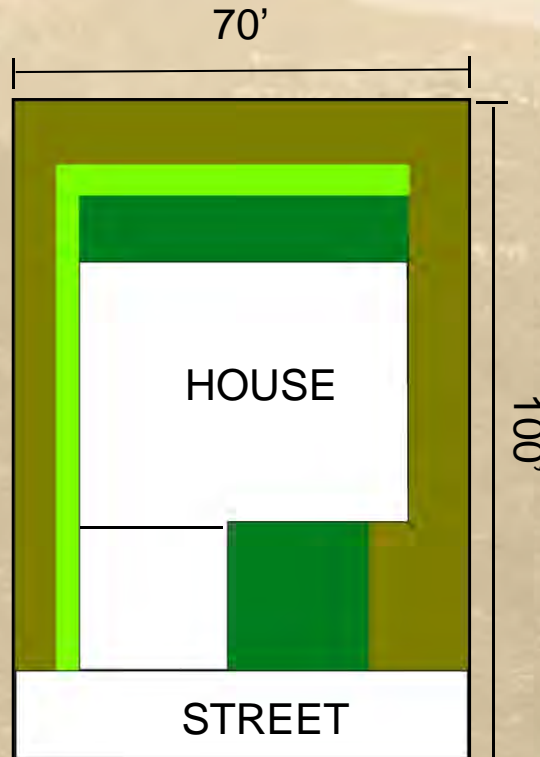
Demand Alternatives

Water Wise Landscaping

Total Irrigation Area = 21.5% of Lot

Irrigated Area (Sq-Ft)

○	Impervious	3,470
●	Turf	1,000
●	Planting	500
●	Non Irrigated	2,000
●	Total Lot	6,970



Annual Demand (Acre-Feet)

Domestic = 0.30

Irrigation = 0.08

Total = 0.38



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Outdoor Water Conservation

Influencing Factors

- Amount of Irrigated Area
- Landscape Materials
- Irrigation System Design & Maintenance
- Water Mgmt

One Single Family Residential Equivalent (SFE)			
Landscaping Alternative	Irrigation Demand		Savings from Traditional
	(acre-feet)	(gallons/sq-ft)	(%)
Traditional	0.35	32.3	---
Moderate Conservation	0.16	15.3	53%
Water Wise	0.08	7.6	76%



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Rainwater Harvesting

Colorado's FIRST Approved Pilot Project



☐ Rainwater:

- Reliable supply of water,
- Possible without injury to senior rights ,
- Major water quality benefits – reduced nutrient loading
- Used in Colorado for a thousand years,
- Became illegal through series of cases.

☐ New law (HB09-1129):

- Passed without opposition,
- Allows for 10 test projects across Colorado,
- Only Historic return flows “owed” to the river.
- SB 09-80 for exempt wells



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Collection Systems



Small Scale Rain Barrel
source: RainBarrelSource.com

- Rain Barrels Individual Cisterns
- Community Cisterns
- Regional Capture Systems
- All Reduce Storm Water Impact.



Alternative to Cisterns – Regional Collection



Construction of an Underground Structural Storage Tank in Rancho Viejo, New Mexico

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How Much Actually Returns to the River?



Total Precipitation =

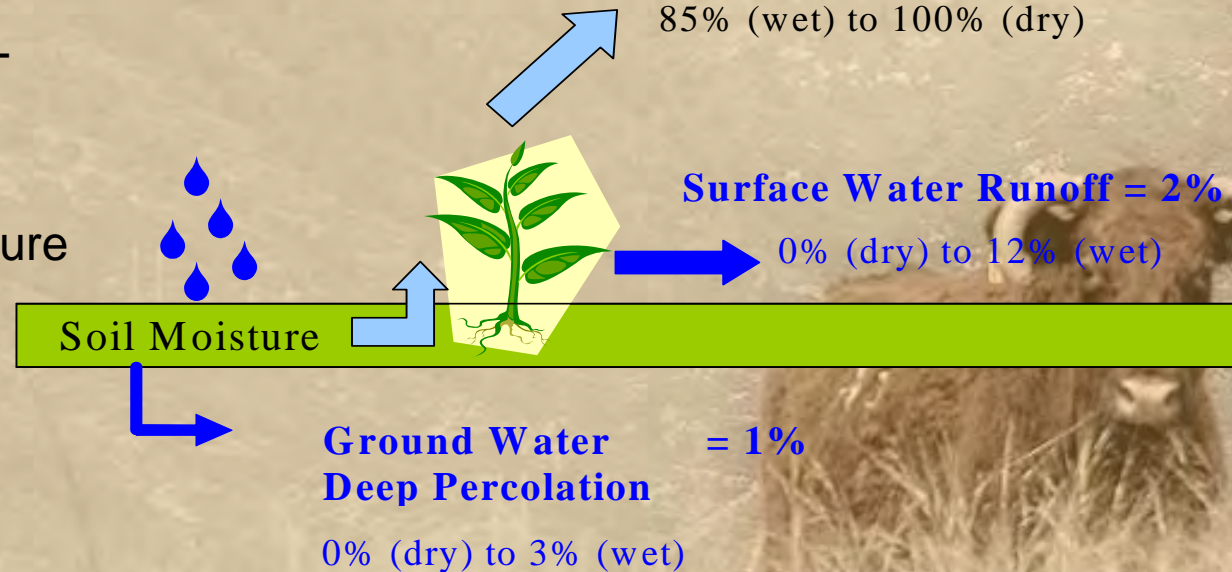
Runoff

- + Native Vegetation ET
- + Winter Sublimation
- + Deep Percolation
- + Change in Soil Moisture



ET/Sublimation = 97%

85% (wet) to 100% (dry)



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Natural Pre-Development Conditions



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Rainwater Harvesting Potential

One Single Family Residential Equivalent (SFE)		
Landscaping Alternative	Supply from RWH	Savings From Traditional
Traditional	0%	---
Traditional w/ Cisterns	12%	12%
Moderate Conservation w/ Cisterns	26%	65%
Water Wise w/ Cisterns	49%	88%



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Pilot Project Progress



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Experimental Demo Site

Demand
Management
: plantings &
irrigation
systems

Rainwater
Capture
allowed under
SB-80



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Land Use and Water Conservation

- ❑ Traffic planning,
- ❑ Recreation & open spaces,
- ❑ Storm water mgmt & low impact development,
- ❑ Clustering of homes with orientation on common areas,
- ❑ Anticipated leisure activities.



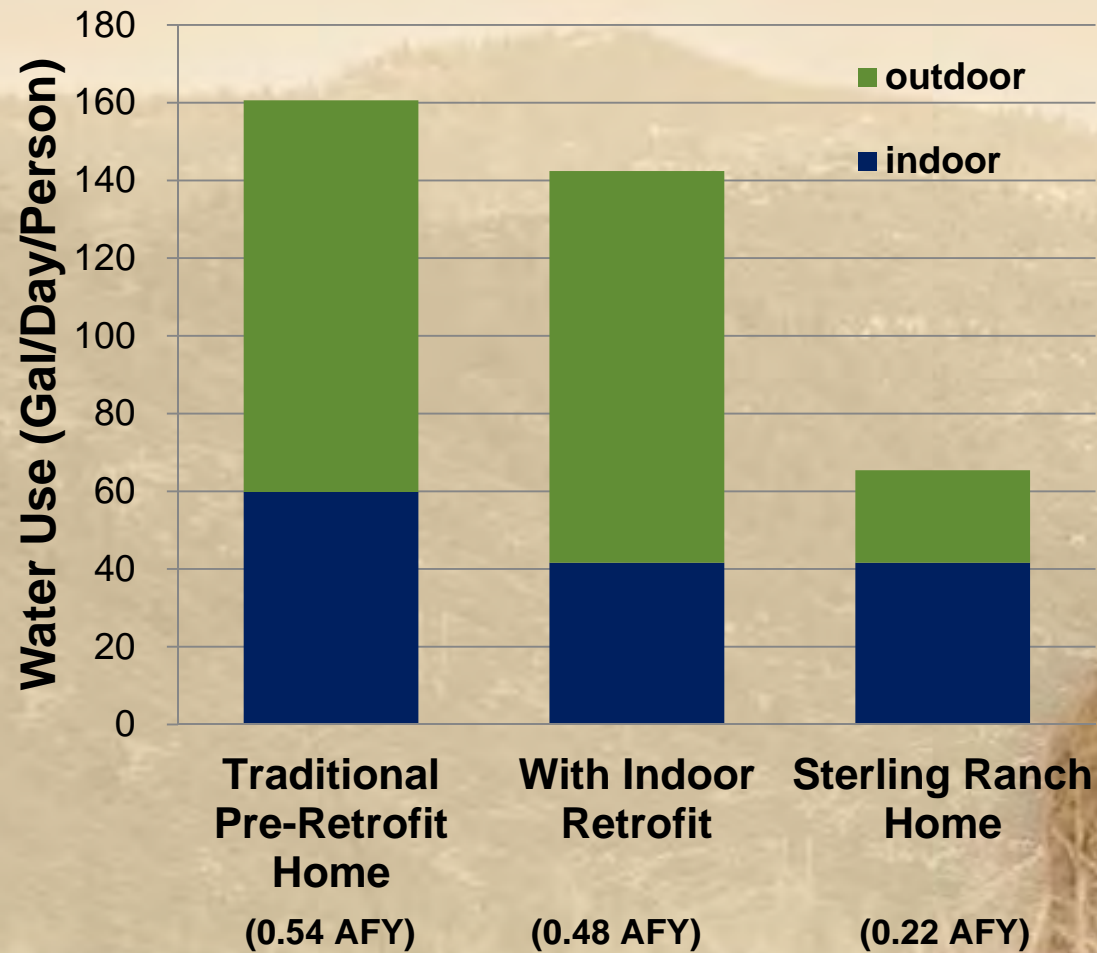
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Waterwise New Homes – Land Use Commitments

- ❑ Indoor Fixtures & Appliances
- ❑ Water Budgets & Inclining Block Rates
- Irrigation System Regulations
- Landscape Plan Approvals
 - Sample Plans for Water Budgets
 - Denver Botanic Gardens teaming
- ❑ Inspections
 - ❑ Pre-purchase Pre-sale
- ❑ Dual Metering



Residential Water Use



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Integrating Water Conservation & Land Use Planning

- ❑ Douglas County approval of Sterling Ranch:
 - Water Conservation Integrated Into The Land Plan
 - Encourages Wise Water Use With Incentives.
 - Incentivizes water conservation Contemplates Lower Bills, Higher Resale Values
 - Includes economically viable alternatives to common historical practices.



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Example of Customer Benefits

Demand Standard (ac-ft per residence):	0.75	0.4	0.286
Gallons Per Year Per Home	244,000	130,000	93,000
Annual Cost per Home (at \$10 per 1,000 gallons/year)	\$2,440	\$1,300	\$932
Monthly Cost per Home	\$203	\$108	\$78



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Strategically Developing Real Estate

- ❑ Time required for entitlement is extensive
 - ❑ Almost 10 Years Since We Began
 - ❑ 5 Years of Hearings
 - ❑ Governmental timing is unpredictable, impacts are tremendous
- ❑ Economics of land development are driven by externalities
- ❑ Water availability and water quality are the most important and potentially limiting factors in the West's future.
- ❑ Utilities must be addressed from a new paradigm to maintain competitive market and high quality of Life



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