

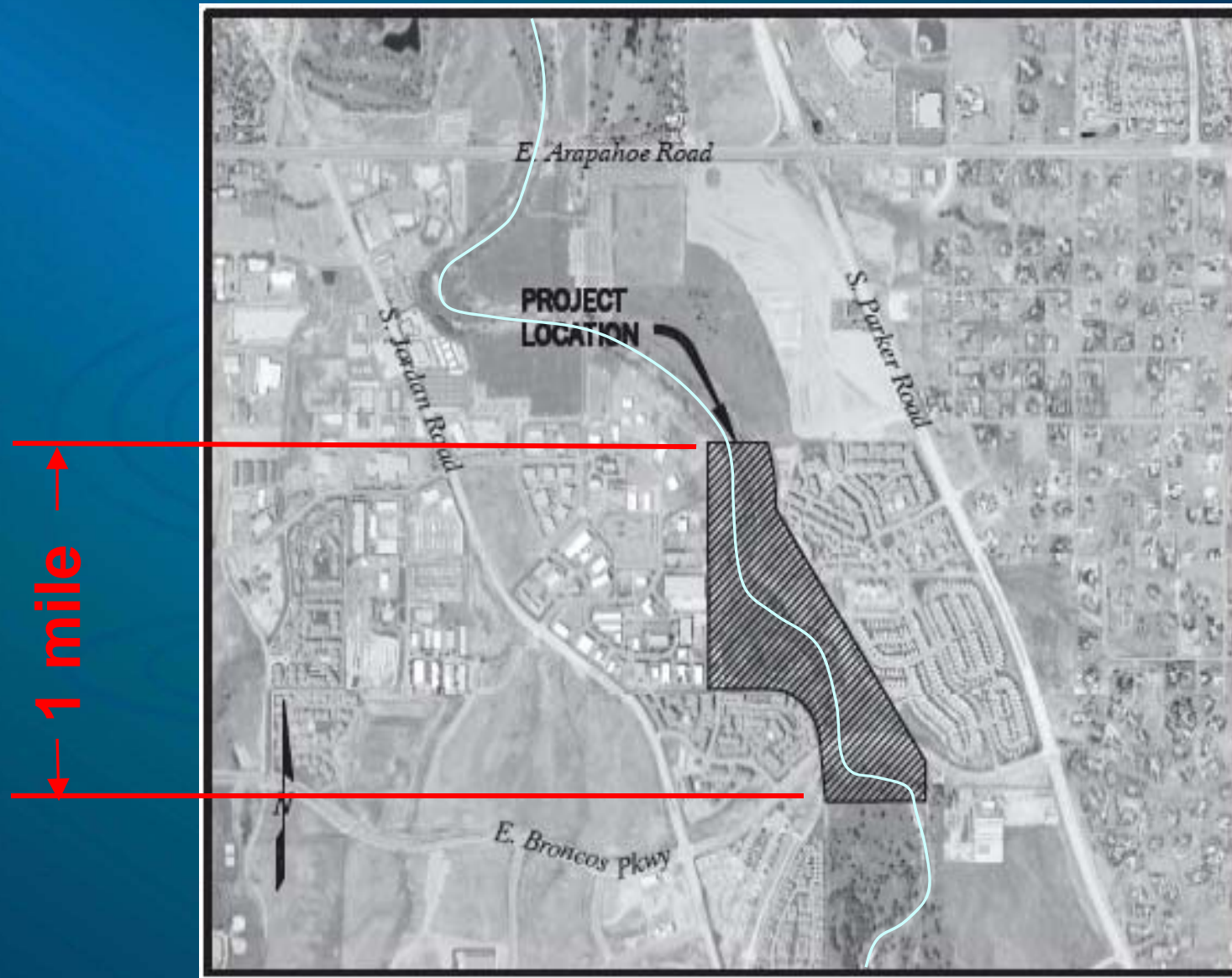
Cherry Creek Valley Ecological Park Improvement Project

CASFM 2015



Cherry Creek Stream Reclamation

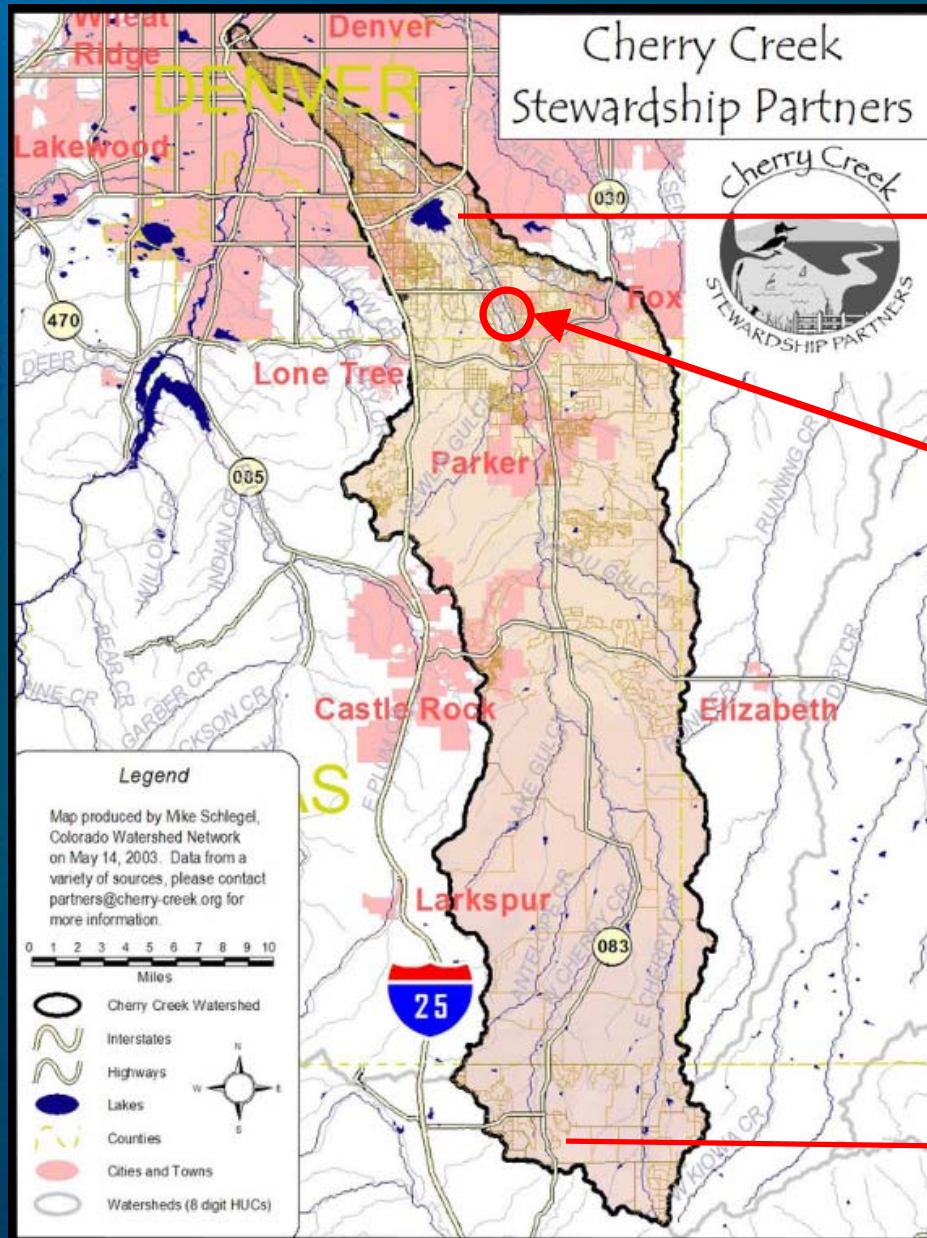
Project Location



Park Area = 75 acres, Reach Length = 5,100 feet

Cherry Creek Stream Reclamation

Cherry Creek Watershed



Cherry Creek Res.

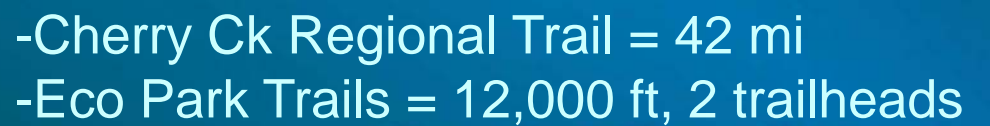
Project Location

- Drainage Basin Area = 350 sq mi
- 100-yr Flow Rate = 47,000 cfs

Monument, CO

Cherry Creek Stream Reclamation

Cherry Creek Trail



Cherry Creek Stream Reclamation



1956



1963



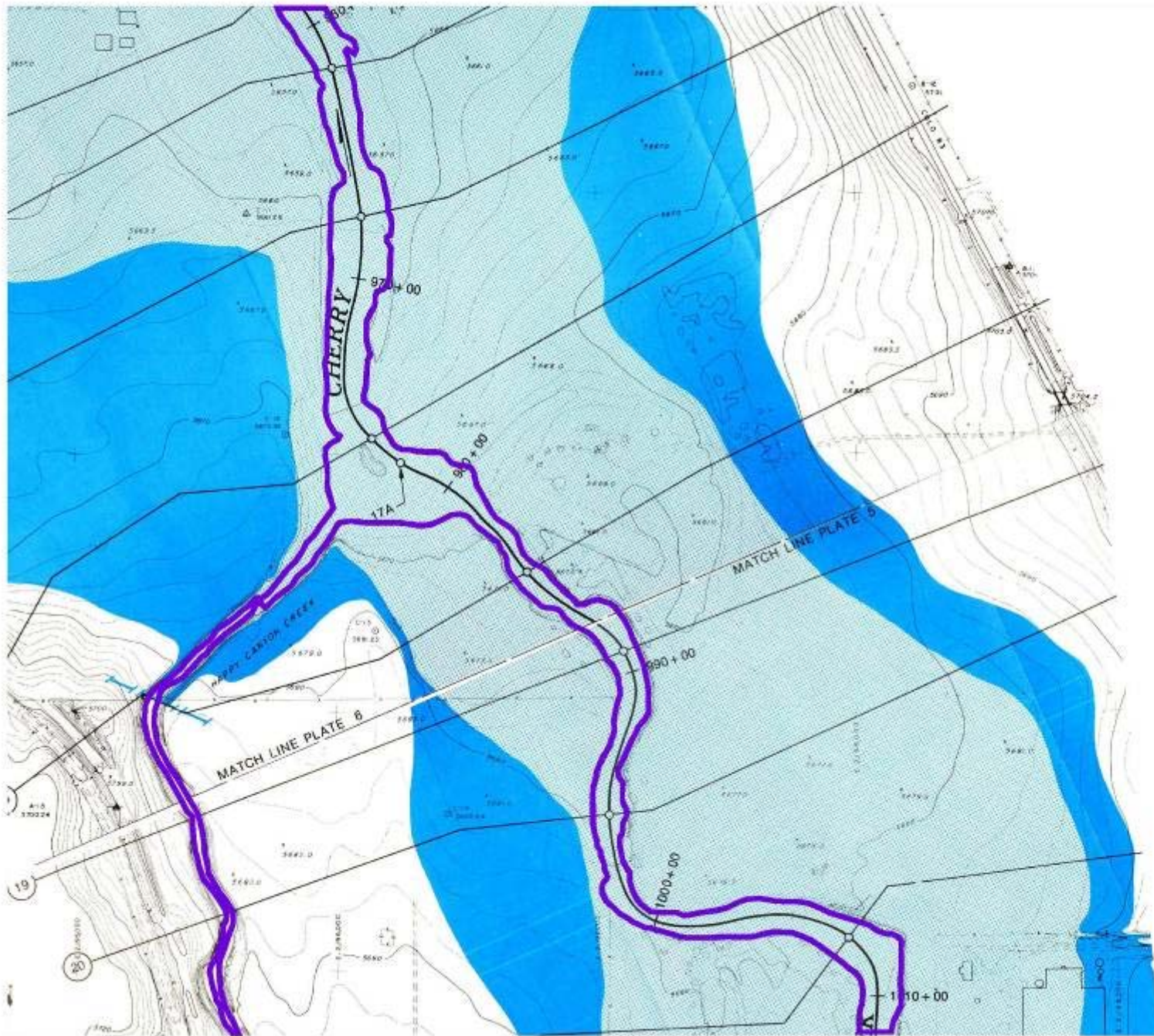
1970



1972



1974



1975



1976



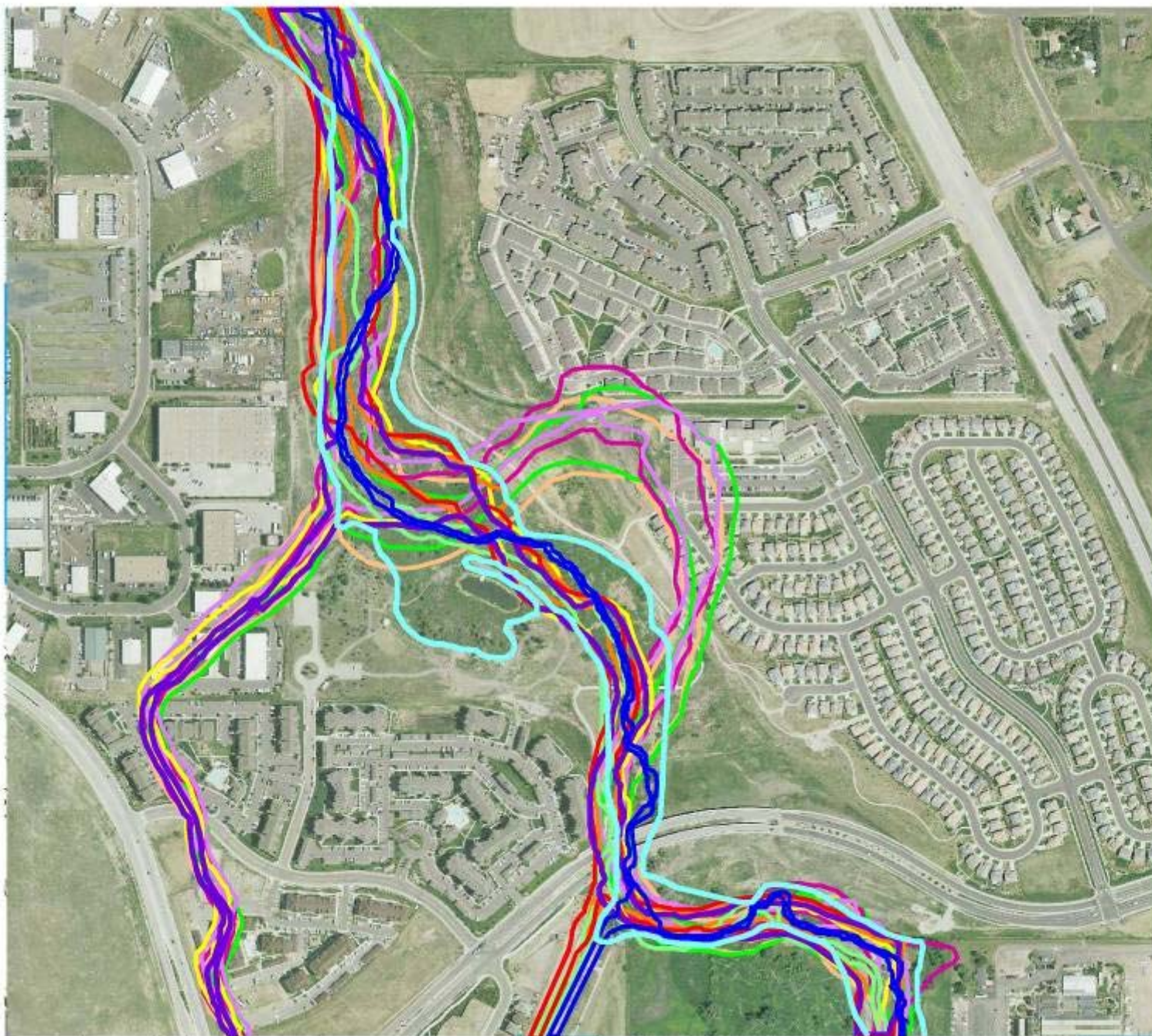
1979



1991



2007



1956

1963

1970

1972

1974

1975

1976

1979

1991

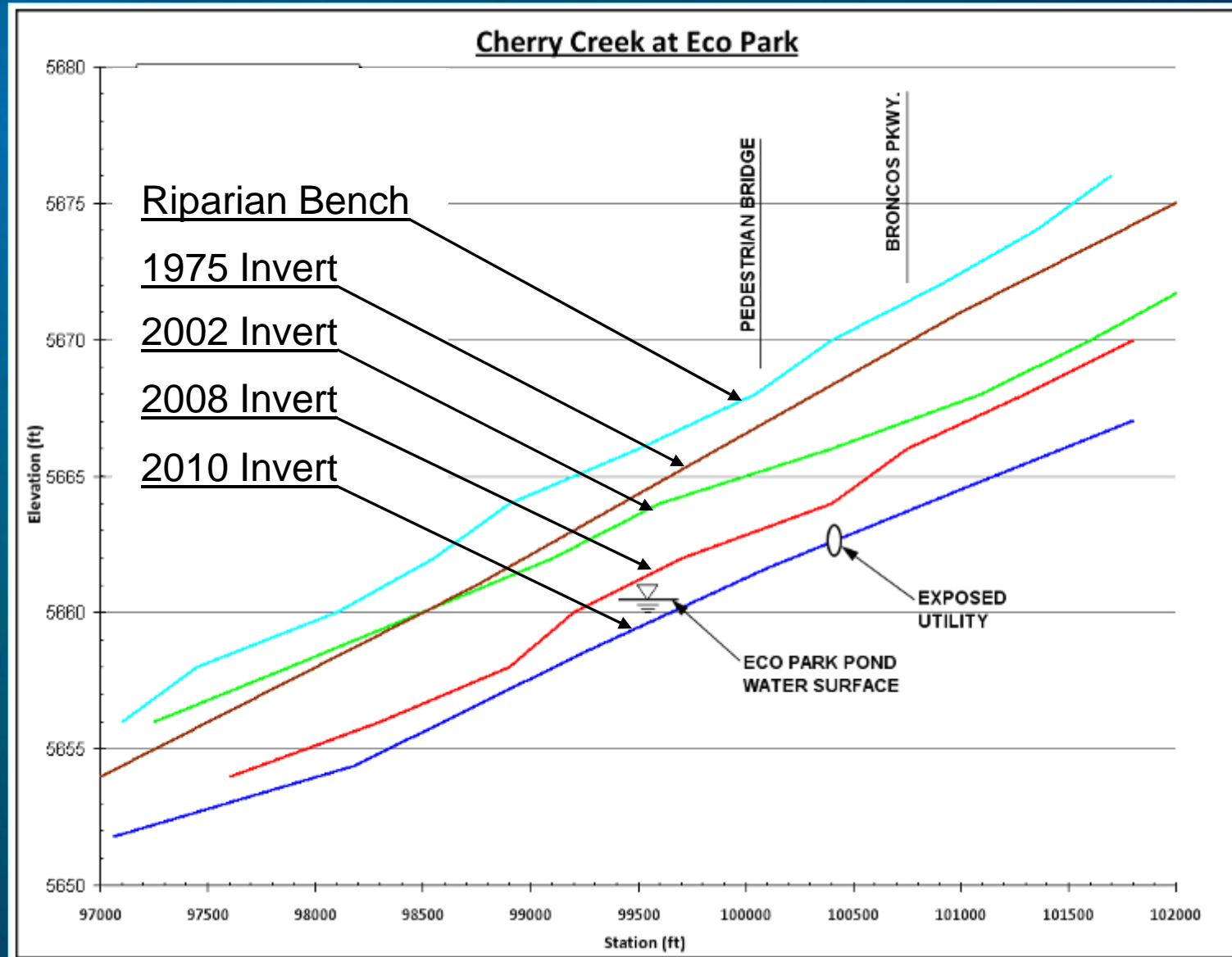
2007

Bench



2007
Bench

Project Reach History



Need for Project



Continual Downcutting
Caused by Development



Cherry Creek Stream Reclamation

Need for Project



More Downcutting...



Cherry Creek Stream Reclamation

Need for Project



More Downcutting...

Trash/Debris in Stream



Cherry Creek Stream Reclamation

Need for Project



Exposed Utilities

More Downcutting...



Cherry Creek Stream Reclamation

Need for Project



Eroded Tributaries

More Downcutting...



Cherry Creek Stream Reclamation

Need for Project



Weeds

Stressed/Dying Vegetation



Cherry Creek Stream Reclamation

Need for Project

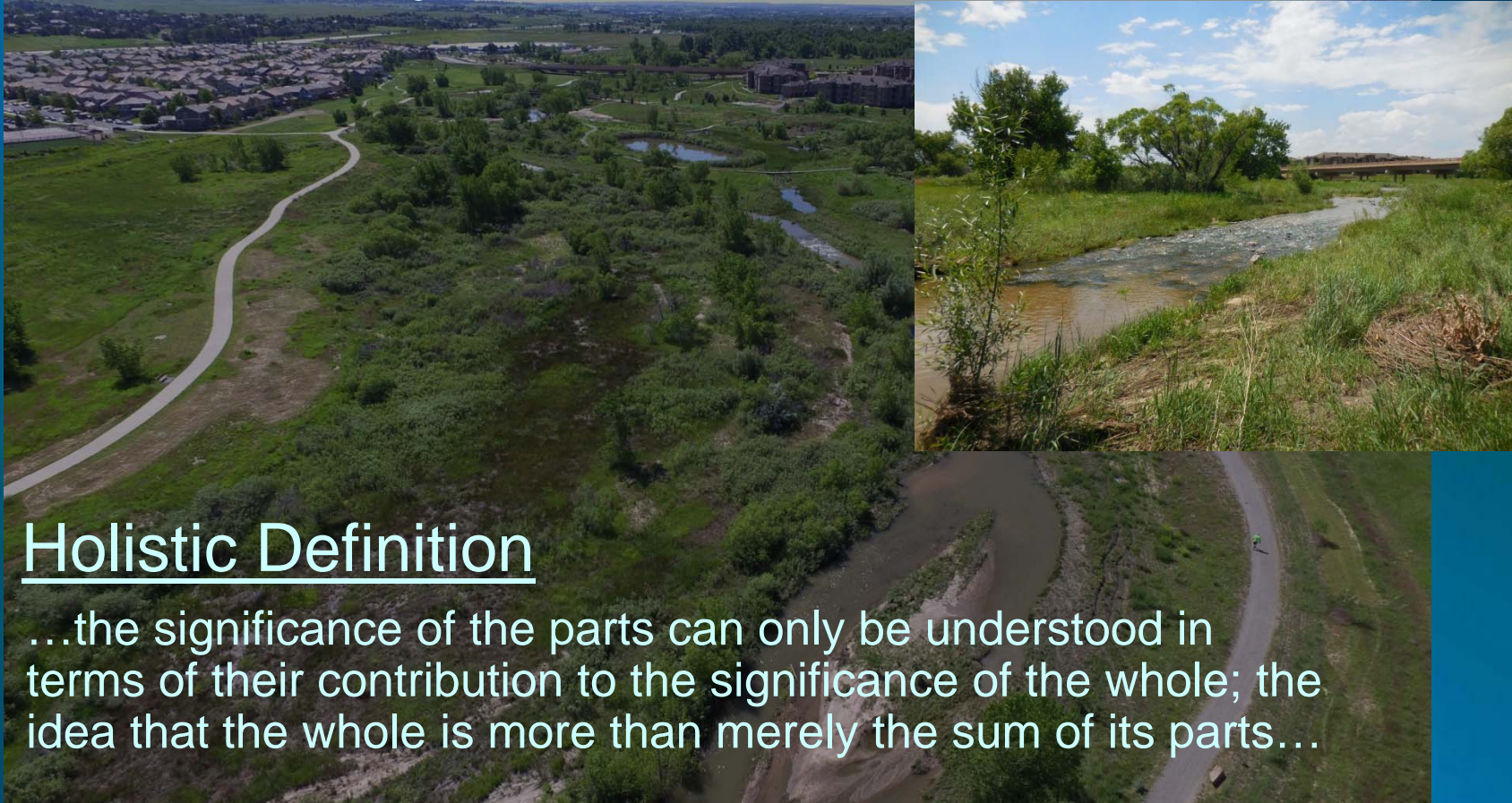


Pond suffering from
lowered water table

Cherry Creek Stream Reclamation

Process to a Thriving Project

Establish Project Vision



Holistic Definition

...the significance of the parts can only be understood in terms of their contribution to the significance of the whole; the idea that the whole is more than merely the sum of its parts...

What type of project do you want?
What tools can help shape the project?

Cherry Creek Stream Reclamation

Process to a Thriving Project

Building a Team



Who is already on the team?

How can we make the rest of the team better?

Cherry Creek Stream Reclamation

Process to a Thriving Project

Partnering



Holistic Partnering Definition

...a close group of people who have developed a trusting relationship, who enjoy working together, and who are passionate and persistent about working on projects that take care of the community and surrounding environment until the project is successfully completed...

How much time, energy, and effort is needed to meet the project vision?

Cherry Creek Stream Reclamation

Process to a Thriving Project

Project Funding

Funding Partners

- SEMSWA = \$1,885,000
- Arapahoe County = \$1,300,000
- CCBWQA = \$955,000
- UDFCD = \$885,000
- PJMD = \$14,000
- CCSP = \$8,000 (silent auction and match)

Total Cost = \$5,047,000

Funding Categories

- Cherry Ck. Channel Stabilization = 39%
- Water Quality = 28%
- Education = 17%
- Tributary Stabilization = 17%

How do you stretch that budget?

What are your team members willing to do to git r done?



On-budget, and
worth every penny!

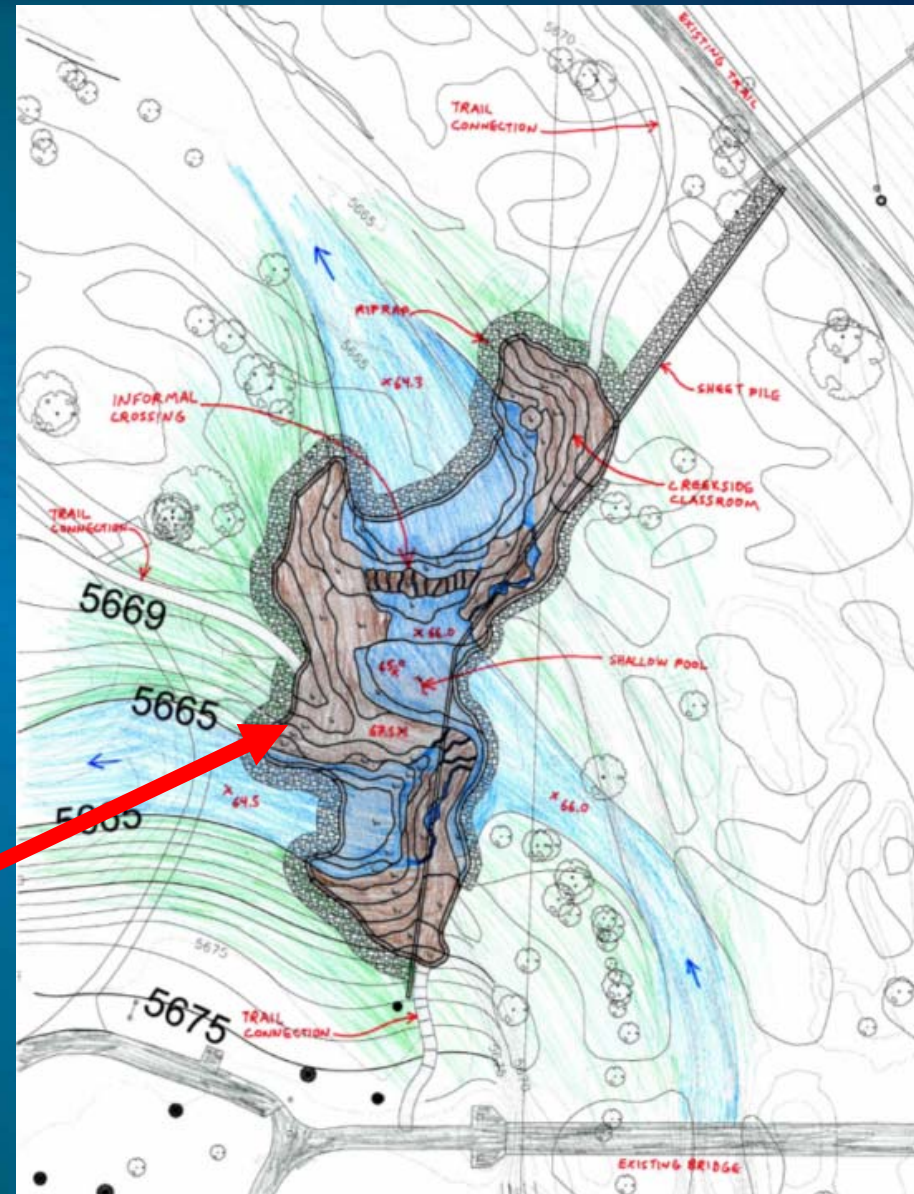
Cherry Creek Stream Reclamation

Process to a Thriving Project

Project Funding

Multi-purpose Design Improvements to accomplish multiple goals:

- Example 1: combined drop structure and trail crossing
- Example 2: combined drop structure and flow measuring flume
- Example 3: combined drop structure, split flow structure, trail crossing, creek-side classroom, and playscape



Cherry Creek Stream Reclamation

Process to a Thriving Project

Project Funding

					Cost Breakdown				Percentage Breakdown			
DESCRIPTION OF BID ITEM	QUANTITY	PAY UNIT	UNIT PRICE	TOTAL COST OF BID ITEM	Cherry Ck Channel Stabilization	Tributary Channel Stabilization	Water Quality	Education	% Cherry Ck Channel Stabilization	% Tributary Channel Stabilization	% Water Quality	% Education
Type H Void-filled Riprap (1' Riffle Drop Structure)	1,900	CY	\$70.00	\$133,000.00	\$79,800.00	\$0.00	\$39,900.00	\$13,300.00	60%	0%	30%	10%
Type H Void-filled Riprap (2' Riffle Drop Structure)	695	CY	\$70.00	\$48,650.00	\$29,190.00	\$0.00	\$14,595.00	\$4,865.00	60%	0%	30%	10%
Type H Void Filled Riprap Rundown (East Tributary)	87	CY	\$70.00	\$6,090.00	\$0.00	\$3,045.00	\$2,436.00	\$609.00	0%	50%	40%	10%
Type H Void Filled Riprap Outlet Protection (East Tributary)	235	CY	\$70.00	\$16,450.00	\$0.00	\$8,225.00	\$6,580.00	\$1,645.00	0%	50%	40%	10%
Splitter Drop Structure - Sculpted Concrete	16,365	SF	\$19.00	\$310,935.00	\$125,728.00	\$0.00	\$164,734.50	\$184,734.50	40%	0%	30%	30%
Splitter Drop Structure - Sheet Pile	4,130	SF	\$30.00	\$123,900.00	\$49,560.00	\$0.00	\$37,170.00	\$37,170.00	40%	0%	30%	30%
Splitter Drop Structure - Buried Type M Soil Riprap	632	CY	\$60.00	\$37,920.00	\$15,168.00	\$0.00	\$11,376.00	\$11,376.00	40%	0%	30%	30%
Happy Canyon Creek Drop Structure - Sculpted Concrete	4,163	SF	\$19.00	\$79,097.00	\$0.00	\$51,413.05	\$19,774.25	\$7,909.70	0%	65%	25%	10%
Happy Canyon Creek Drop Structure - Concrete Cutoff Wall	34	CY	\$300.00	\$10,200.00	\$0.00	\$6,630.00	\$2,550.00	\$1,020.00	0%	65%	25%	10%
Happy Canyon Creek Drop Structure - Buried Type M Soil Riprap	145	CY	\$60.00	\$8,700.00	\$0.00	\$5,655.00	\$2,175.00	\$870.00	0%	65%	25%	10%
Broncos Parkway Drop Structure - Sculpted Concrete	7,653	SF	\$19.00	\$145,407.00	\$87,244.20	\$0.00	\$43,622.10	\$14,540.70	60%	0%	30%	10%
Broncos Parkway Drop Structure - Concrete Cutoff Wall								\$12,810.00	60%	0%	30%	10%
Broncos Parkway Drop Structure - Buried Type M Soil Riprap								\$1,890.00	60%	0%	30%	10%
Broncos Parkway Drop Structure - Sheet Pile								\$1,440.00	60%	0%	30%	10%
Trail Creek Drop Structure - Sculpted Concrete								\$27,000.00	30%	0%	30%	40%
Trail Creek Drop Structure - Concrete Cutoff Wall								\$11,400.00	30%	0%	30%	40%
Trail Creek Drop Structure - Buried Type M Soil Riprap								\$2,052.00	10%	0%	30%	60%
Trail Creek Drop Structure - Sheet Pile								\$3,182.50	60%	0%	30%	10%
Trail Creek Drop Structure - Concrete Cutoff Wall								\$540.00	60%	0%	30%	10%
Trail Creek Drop Structure - Buried Type M Soil Riprap								\$774.00	60%	0%	30%	10%
Tie-In Drop Structure - Sculpted Concrete								\$2,820.00	80%	0%	10%	10%
Tie-In Drop Structure - Concrete Cutoff Wall								\$18,000.00	80%	0%	10%	10%

Splitter Drop Sheet Pile Cutoff Wall:

40% Channel stabilization

0% Trib. Stabilization

30% Water quality

30% Education

Cherry Creek Stream Reclamation

Process to a Thriving Project

Intentional Scheduling

Proactive, get in there
before it's too late!



Dying...



...Dead

Cherry Creek Stream Reclamation

Process to a Thriving Project

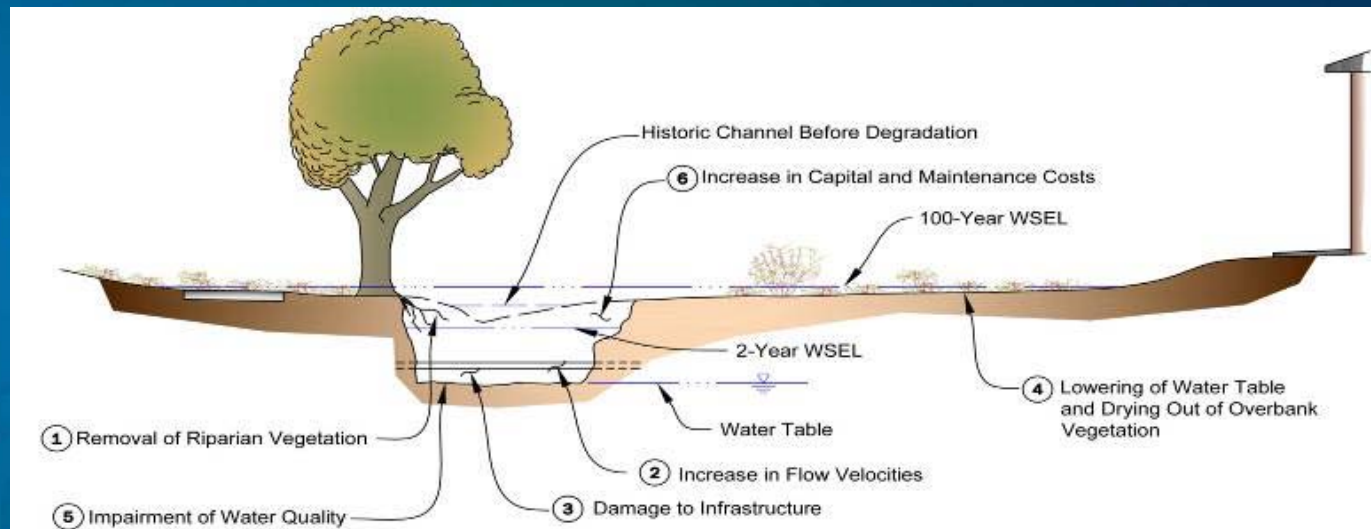
Intentional Scheduling

- January 2010 to December 2010..... Preliminary Design
- January 2011 to June 2012 Final Design
- January 2012 to June 2012 Environmental Permitting
- February 2012 to June 2012 FEMA Floodplain Revision
- July 2012 to August 2012 Bidding/Award
- August 2012 to May 2013 Heavy Construction
- March 2014 to April 2014..... Supplemental Planting

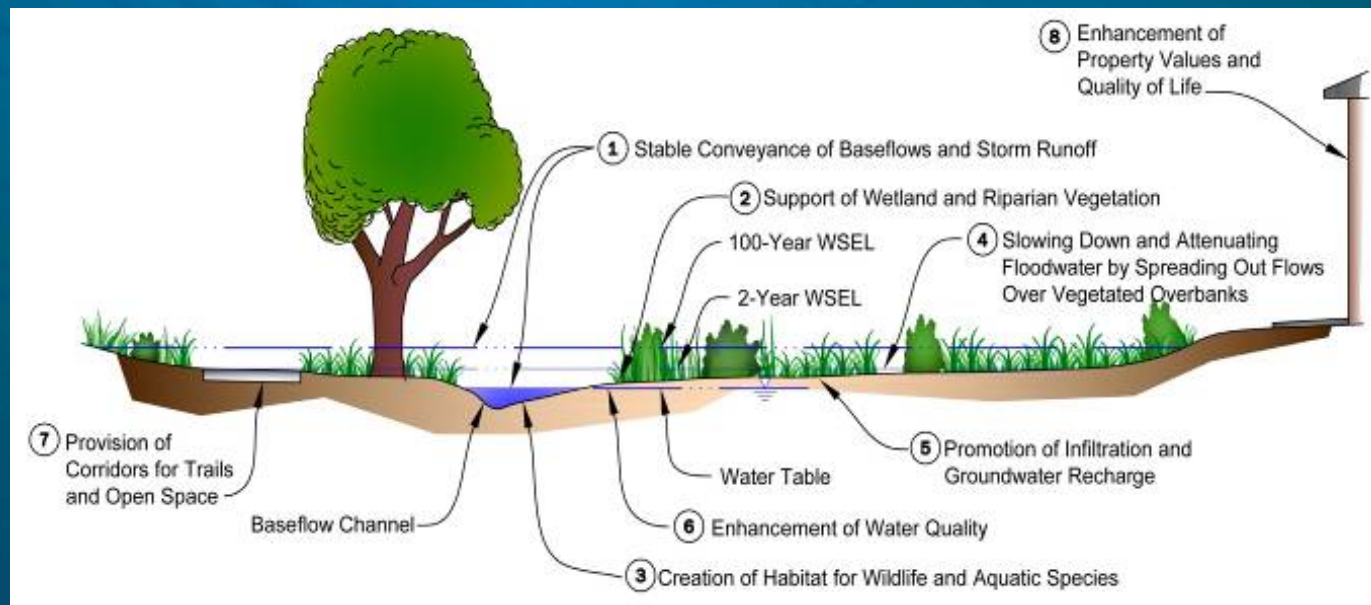
On-time and at the right time!

Design Process

Before



After



Cherry Creek Stream Reclamation

Design Process



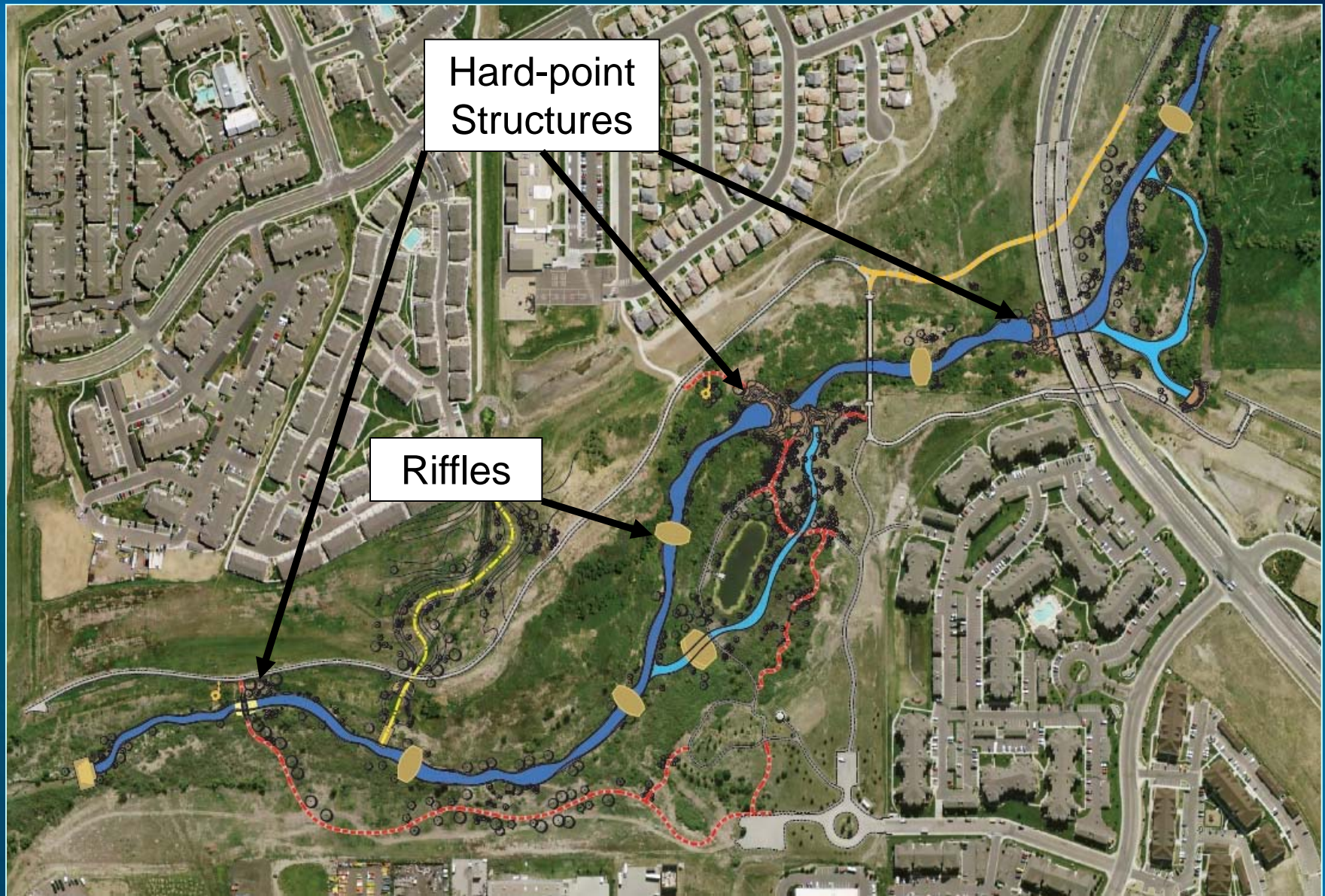
Cherry Creek Stream Reclamation

Design Process



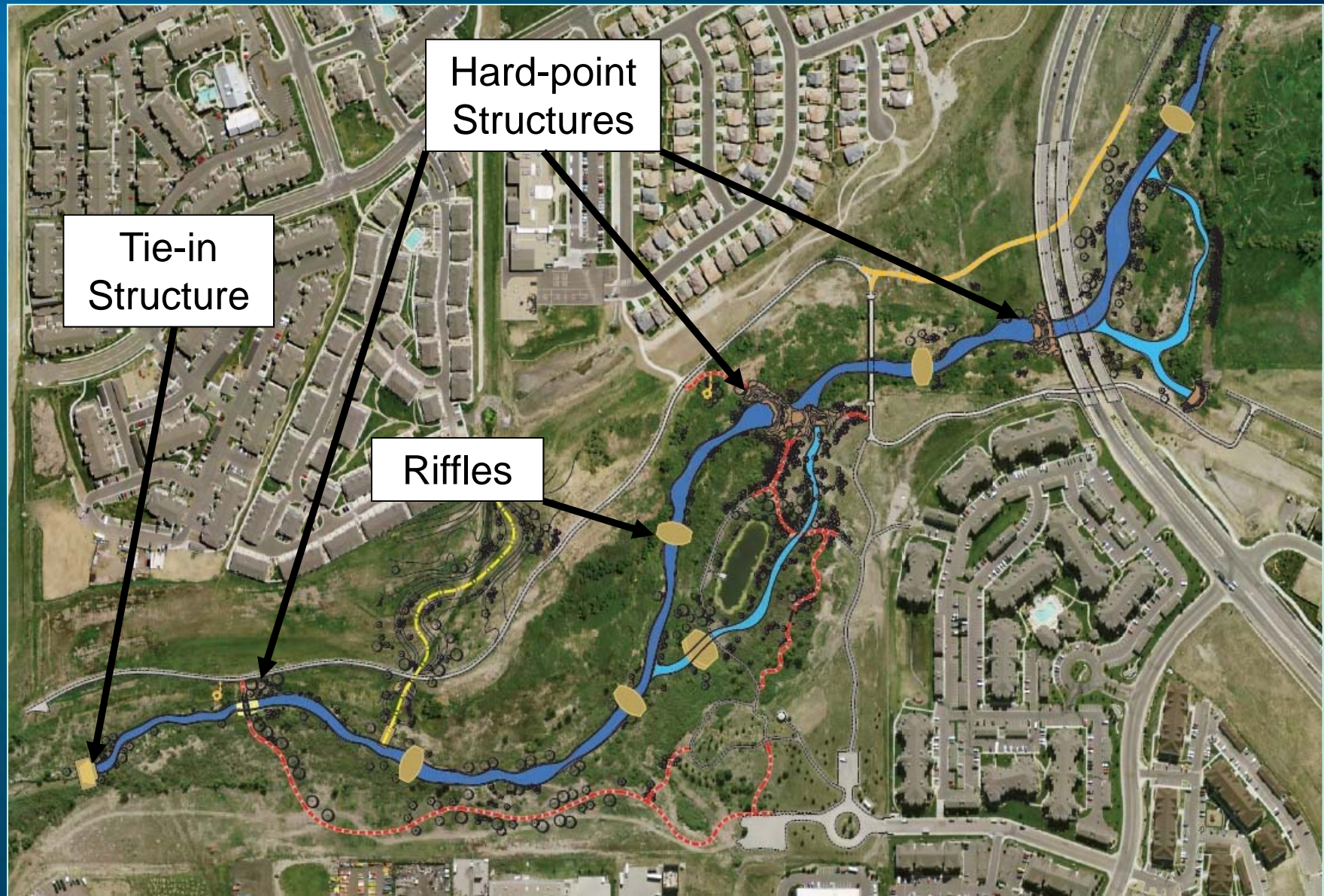
Cherry Creek Stream Reclamation

Design Process



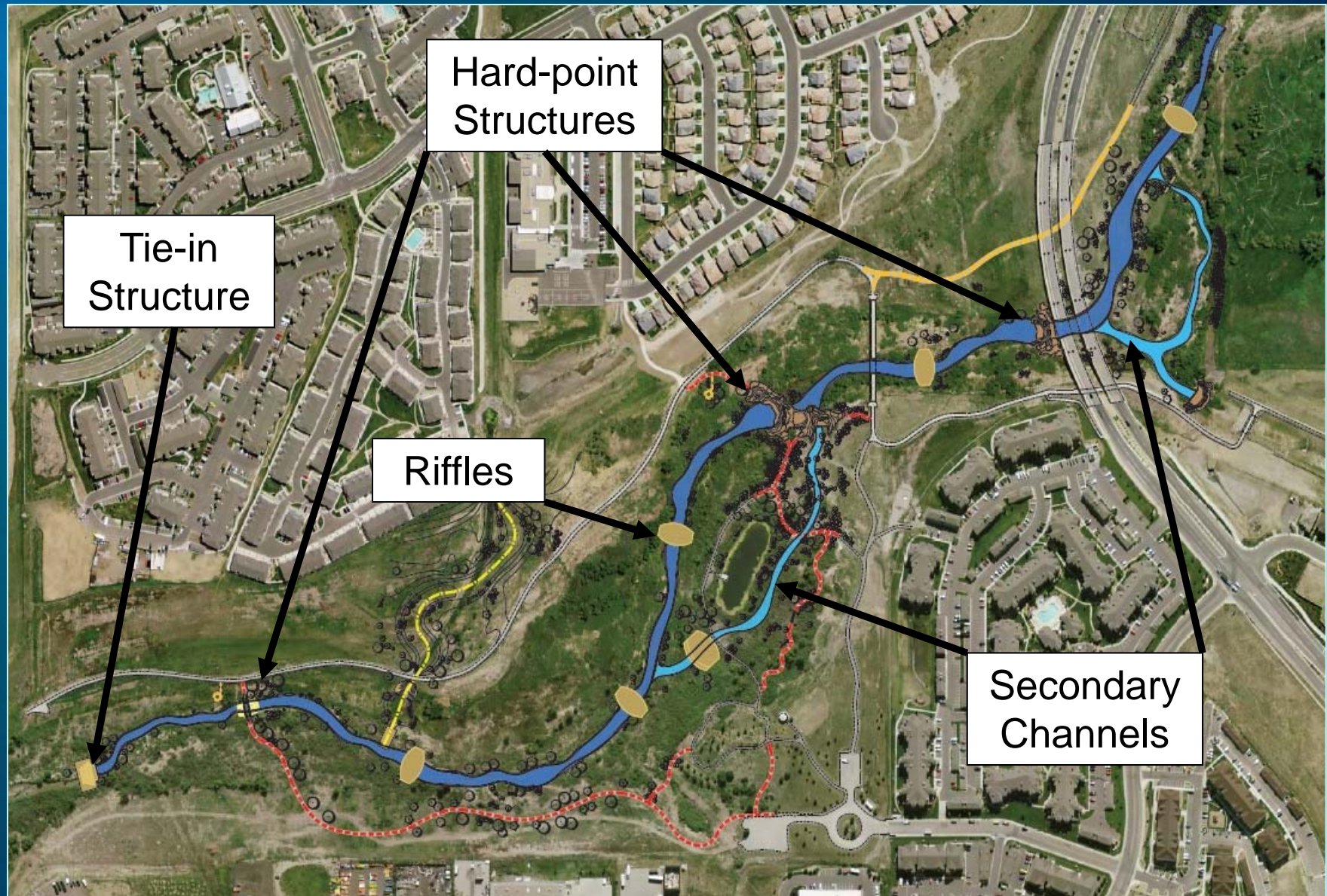
Cherry Creek Stream Reclamation

Design Process



Cherry Creek Stream Reclamation

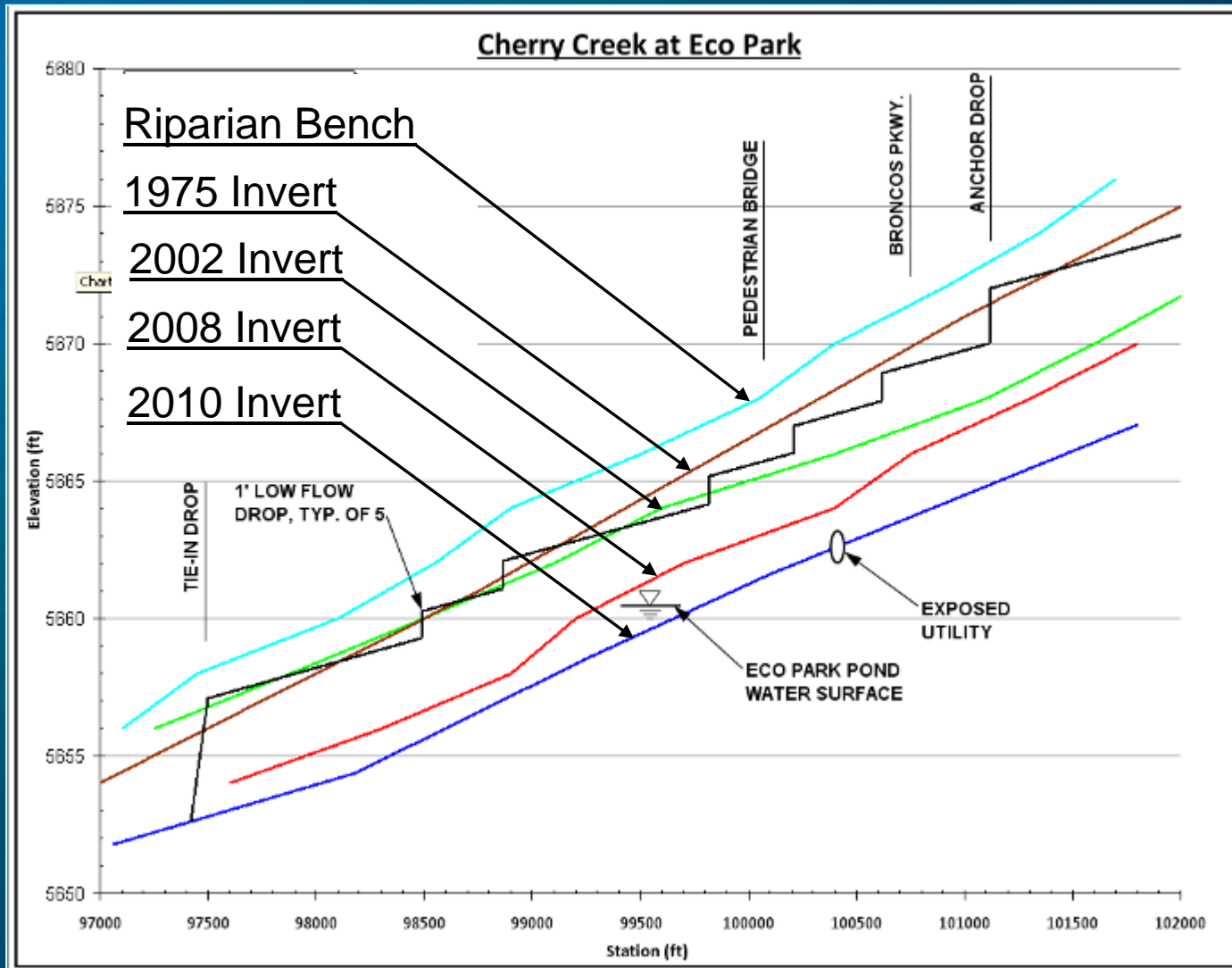
Design Process



Cherry Creek Stream Reclamation

Design Process

Grade Control



Cherry Creek Stream Reclamation

Floodplain

-

Construction Process



**SITE CONSTRUCTION
MANAGEMENT**



As good as it gets!!!

Cherry Creek Stream Reclamation

Finished Product

Raised Channel



Before



After

Cherry Creek Stream Reclamation

Finished Product

Raised Channel



Before



After

Cherry Creek Stream Reclamation

Finished Product

Riffle Structures



- Low-height
- Void-filled Riprap
- Relies on overbank veg

Cherry Creek Stream Reclamation

Finished Product

Riffle Structures



- Natural Look
- Caters to Fish/Wildlife
- Improves water quality
- Inexpensive

Cherry Creek Stream Reclamation

Finished Product

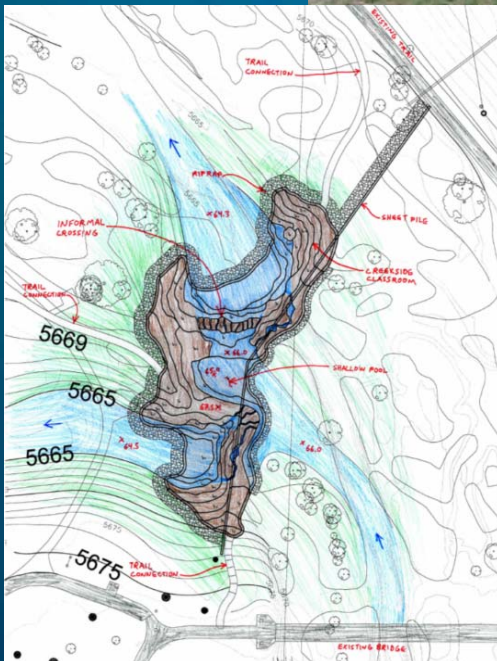
Broncos Parkway Drop Structure



Cherry Creek Stream Reclamation

Finished Product

Splitter Drop Structure



Cherry Creek Stream Reclamation

Finished Product

Splitter Drop Structure



Cherry Creek Stream Reclamation

Finished Product

Splitter Drop Structure



Cherry Creek Stream Reclamation

Finished Product

Trail Crossing Drop Structure



Cherry Creek Stream Reclamation

Finished Product

Tie-in Drop Structure / Gauging Station



Cherry Creek Stream Reclamation

Finished Product

Secondary Channels

Before



After

Cherry Creek Stream Reclamation

Finished Product

Secondary Channels

Before



After

Cherry Creek Stream Reclamation

Finished Product

Bank Protection

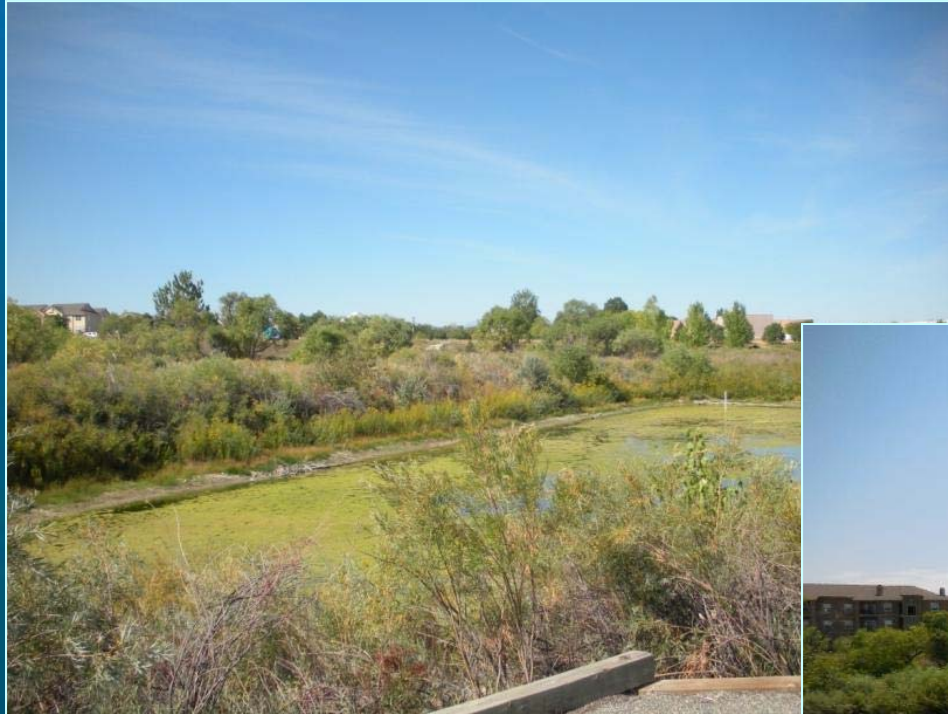


Bioengineered Approach: 6,340 LF installed!

Cherry Creek Stream Reclamation

Finished Product

Pond



Before



After

Cherry Creek Stream Reclamation

Finished Product

Planting Plan



- 256 trees
- 960 shrubs
- 11,281 willow stakes
- 10,315 grass plugs
- 3925 LF willow logs
- 28 acres of seed

Finished Product

Mission Accomplished!!!

- Improved water quality
- Stable/safe storm flow corridor
- Protected infrastructure
- Enhanced ecological function
- Enhanced educational and recreational amenities
- Sustainable/low maintenance stream system.

Healthy Community

Community Definition

...a group sharing common characteristics or interests and perceiving itself as distinct from the larger society within which it exists...

Healthy Community Definition

...a community that encapsulates both the health of people and place...

Community with:

- stakeholders, clients, consultants, construction personnel, reviewing agencies, park users, regional trail users, students, businesses, surrounding public, wildlife, environment...

Healthy Community

Trails

Concrete Regional



Crusher fines
(one-mile loop)



Boardwalks

Cherry Creek Stream Reclamation

Healthy Community

Amenities



Signage

Picnic/Resting Areas



Cherry Creek Stream Reclamation

Healthy Community

Amenities



Outdoor Classrooms

Cherry Creek Stream Reclamation

Healthy Community

Public Involvement

- Public Meetings
- County Website Updates
- Mailings
- Email Announcements
- Flyers
- Facebook
- Elementary School Coord.
- Onsite tours
- Volunteer Efforts
- Eagle Scout Projects



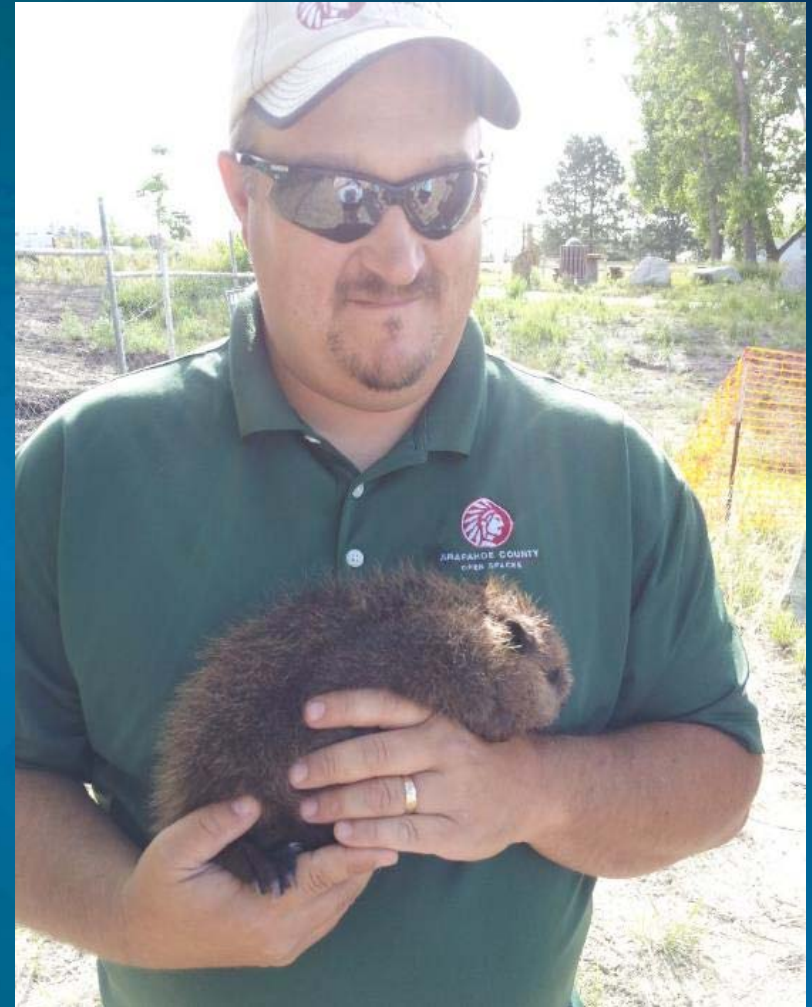
Strengthened bonds
between the project
and the community

Cherry Creek Stream Reclamation

Healthy Community



Everyone matters...



Cherry Creek Stream Reclamation

Healthy Community



Wildlife community too...



Cherry Creek Stream Reclamation

Healthy Community

Adventure and Recreation...



Cherry Creek Stream Reclamation

Healthy Community



Something for everyone...

Cherry Creek Stream Reclamation

Healthy Community



Education...

Cherry Creek Stream Reclamation

Healthy Community

Volunteering...



Cherry Creek Stream Reclamation

Healthy Community

Children's Creekside Quest Playscape



Cherry Creek Stream Reclamation

Healthy Community

Children's Creekside Quest Playscape



Cherry Creek Stream Reclamation

Healthy Community

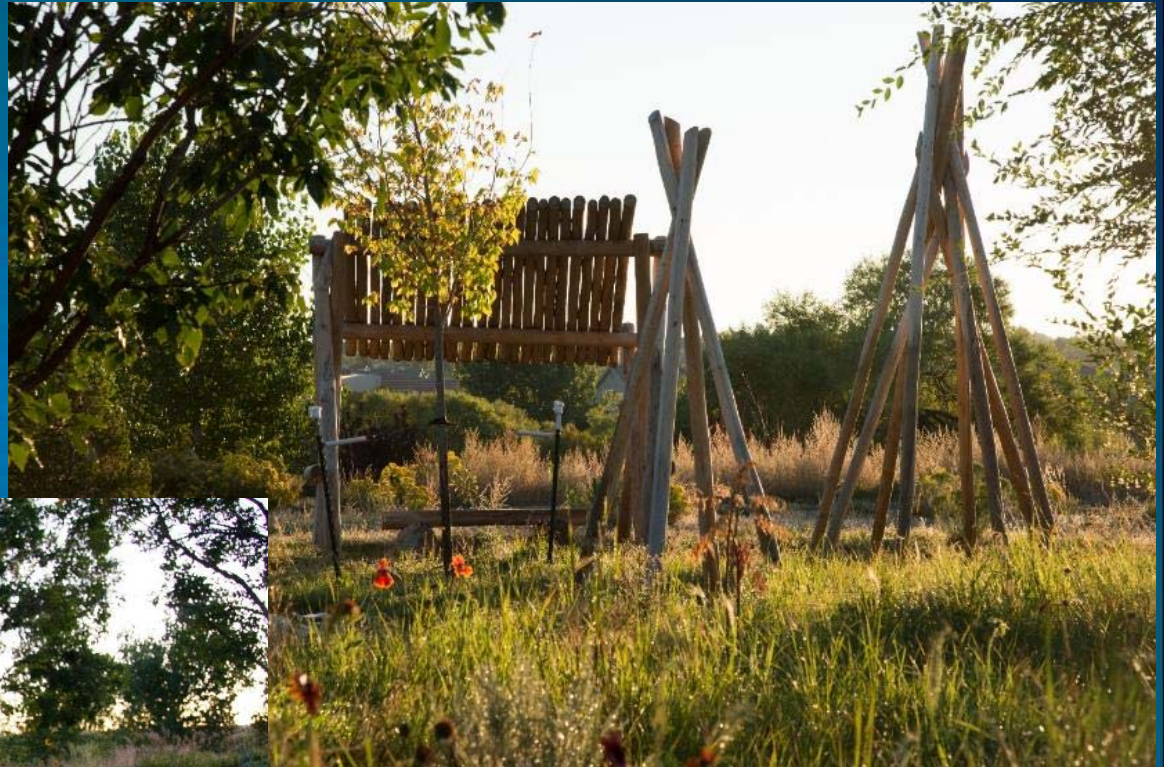
Children's Creekside Quest Playscape



Cherry Creek Stream Reclamation

Healthy Community

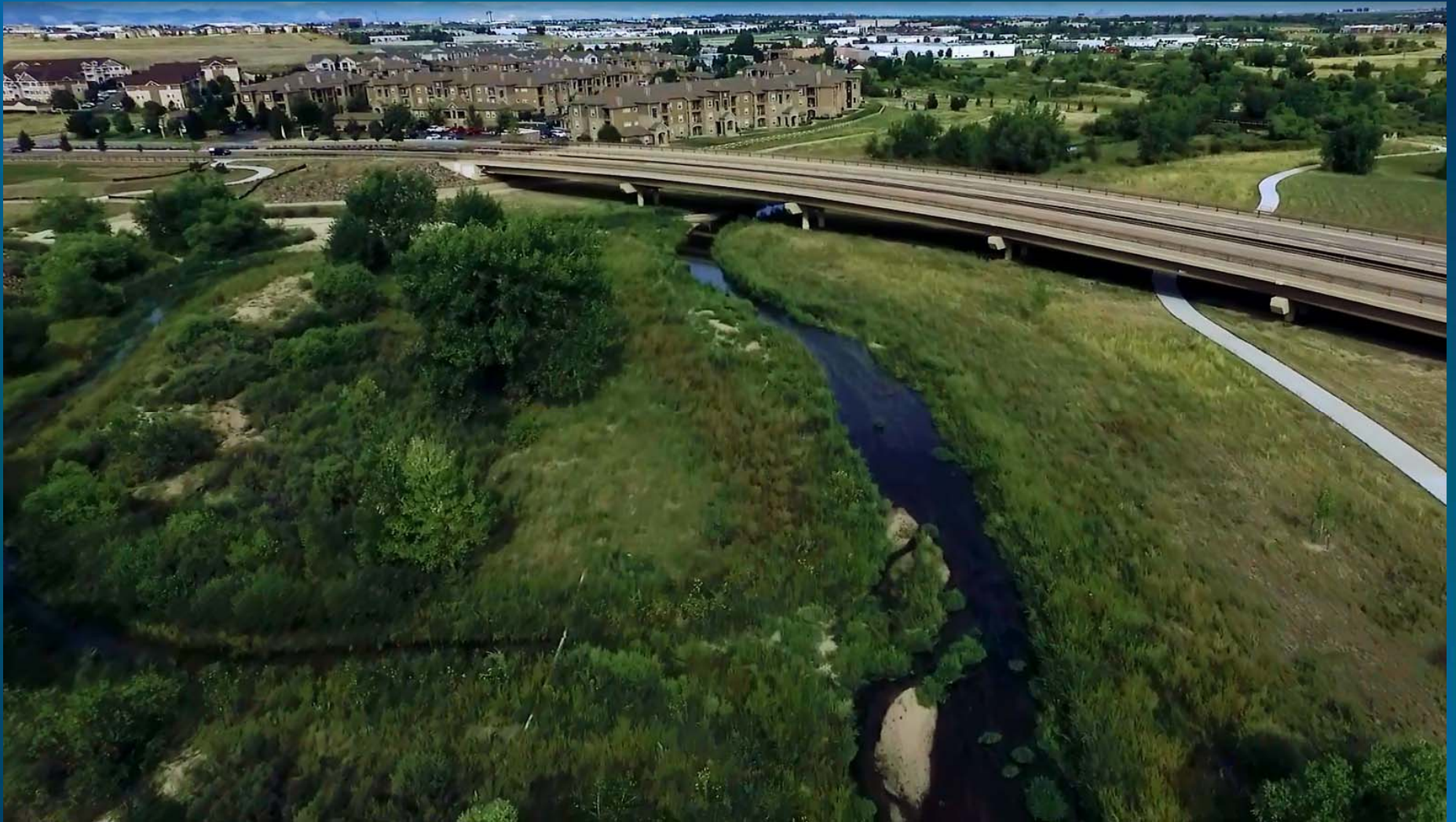
Children's Creekside Quest Playscape



Cherry Creek Stream Reclamation

Virtual Tour

Video: [09-031.04 Cherry Creek at Eco Park v7.mp4](#)



Cherry Creek Stream Reclamation

Finished Product



Cherry Creek Stream Reclamation

Finished Product



Cherry Creek Stream Reclamation

Finished Product



Cherry Creek Stream Reclamation

Finished Product



Cherry Creek Stream Reclamation

Finished Product



Cherry Creek Stream Reclamation

Measures of Success

Enhancement of Public Health, Safety and Welfare

- Safe stabilized channel
- Protected infrastructure
- Improved water quality
- Improved flood corridor
- Expanded educational and recreational opportunities

Measures of Success

Enhancement of Surrounding Environment

- Revitalized existing vegetation
- Extensive planting plan
- Enhanced wildlife habitat
- Fish friendly structures
- Improved water quality

Measures of Success

Creative, Unique, Innovative Solutions

- Multi-purpose improvements
- Variety of drop materials/techniques
- Expanded riparian/flood corridor
- Secondary channels
- Bioengineered bank protection
- Creekside Quest
- Volunteer efforts

Measures of Success

Multiple Objective Management

- Holistic Partnering
- Efficient dollars
- Protect infrastructure
- Improve water quality
- Safe open space
- Improved flood conveyance
- Enhance educational/recreational value
- Enhance wildlife habitat
- Provide flow monitoring

Measures of Success

Problem Solutions, Budget Goals, and Time Schedule

- Survived 2013 storm
- Improvements functioning as intended
- Creative funding
- Intentional scheduling

Measures of Success

A Model for Other Communities and Projects

- Holistic partnering
- Healthy community
- Cost breakdown
- Dedicate wide open spaces
- Proactive implementation
- Be innovative

Thank you



Cherry Creek Stream Reclamation