

STATE OF COLORADO

Colorado Water Conservation Board

Department of Natural Resources

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TO: Colorado Water Conservation Board Members

FROM: Veva Deheza, Section Chief
Office of Water Conservation & Drought Planning

DATE: September 2, 2009

SUBJECT: **Agenda Item #15, September 15-16, 2009 Board Meeting**
CWCB Criteria and Guidelines for the Rainwater Harvesting Pilot Project
Program Guidelines

Staff Recommendation

This is an *informational* item only and Board action is not required. However, this item will be placed on the November 2009 CWCB Board agenda for possible Board action.

Background

On June 2, 2009, Governor Ritter signed the *Act Concerning an Authorization of Pilot Projects for the Beneficial Use of Captured Precipitation in New Real Estate Development, and Making an Appropriation in Connection Therewith*, as approved under House Bill (H.B.) 09-1129. The Act calls for the Board to establish Criteria and Guidelines for pilot project applications and the selection of pilot projects and for the Board, in consultation with the State Engineer, to select pilot project sponsors.

This agenda item describes the CWCB response to implement the Act. CWCB staff have developed Draft Criteria and Guidelines in consultation with the State Engineer, for presentation to the Board at its September 15, 2009 meeting, for informational purposes only. Following a stakeholder review process, updated Draft Criteria and Guidelines will be presented to the Board for consideration at its November 2009 meeting with intention of Final Criteria and Guidelines being approved by the Board in January 2010.

Presentation

Staff will make a presentation to the CWCB Board of the draft Rainwater Harvesting Pilot Project Program Criteria and Guidelines.

Attachment

Draft Criteria and Guidelines for the Rainwater Harvesting Pilot Project Program.



COLORADO WATER CONSERVATION BOARD



Authorization of Pilot Projects for the Beneficial Use of Captured Precipitation in New Real Estate Developments Criteria and Guidelines for the “Rainwater Harvesting” Pilot Project Program

INTRODUCTION

Purpose

The purpose of this document is to describe the Colorado Water Conservation Board (CWCB) process to implement the *Act Concerning an Authorization of Pilot Projects for the Beneficial Use of Captured Precipitation in New Real Estate Development, and Making an Appropriation in Connection Therewith*, as approved under House Bill (H.B.) 09-1129. The Act calls for the Board to establish Criteria and Guidelines¹ for pilot project applications and the selection of pilot projects and for the Board, in consultation with the State Engineer, to select pilot project sponsors. CWCB staff developed Draft Criteria and Guidelines in consultation with the State Engineer and presented to the Board at its September 15, 2009 meeting, for informational purposes only. Following a stakeholder review process, updated Draft Criteria and Guidelines will be presented to the Board for consideration at its November 2009 meeting with intention of Final Criteria and Guidelines being approved by the Board in January 2010.

Background

Rainwater harvesting was long overlooked in Colorado primarily for two reasons: 1) historically relatively abundant and low-cost alternative water supplies have been available, and 2) prior to the passage of legislation in the 2008-2009 session, the law required 100% replacement of any precipitation captured out-of-priority, thereby requiring water users to find an equal amount of replacement water in like time, place, and amounts. In 2007, a study entitled *Holistic Approach to Sustainable Water Management in Northwest Douglas County*² was published under the CWCB Water Efficiency Grant Program. The study emphasized the importance of pairing outdoor water management with rainwater harvesting to maximize water conservation potential. The study concluded that five main factors influence outdoor water demands:

- (1) amount of irrigated area,
- (2) landscaping material selection and corresponding water demand,
- (3) irrigation system performance, including sprinkler system efficiency and effects of installation, operations, and maintenance,
- (4) irrigation system technology such as rain gages and evapotranspiration controllers,
- (5) provider commitment and public acceptance.

Three outdoor water management strategies were considered, each based on an acceptable “look” of the landscaping to the public, as validated by the study advisory committee: (a) the traditional scenario included bluegrass with traditional plantings and spray irrigation, (b) the moderate scenario included fescue turf with a lower water demand than bluegrass, plantings

classified as moderately consumptive, a portion of the potentially irrigated landscape was non-irrigated, and rotor irrigation (c) the water wise scenario included fescue turf with native plantings, an increase in non-irrigated areas, and subsurface drip irrigation.

Using historical hydrology data and commonly accepted quantification methods, the study concluded that with rainwater and snowmelt harvesting, outdoor water demand could be reduced by approximately 65% with “moderate conservation” and approximately 88% with “water wise conservation” as those scenarios were defined in the study. The study concluded that lawn and garden irrigation demands could be significantly reduced by using rainwater and snowmelt harvesting, particularly when paired with active water management techniques while maintaining a landscape appearance acceptable to Coloradans. The study recommended statutory law be crafted to allow precipitation capture and use with augmentation requirements based on maintaining the amount, timing, and location of historical runoff and deep percolation.

RAINWATER HARVESTING PILOT PROJECT PROGRAM DEFINITION, GOALS, AND PURPOSES

H.B. 09-1129³ addressed one of the recommendations from the *Holistic Approach to Sustainable Water Management in Northwest Douglas County* study with the authorization of up to ten pilot projects for new residential or mixed-use developments, providing an opportunity to further evaluate implementation of rainwater and snowmelt harvesting in Colorado (collectively referred to as “rainwater harvesting”). The CWCBC defines rainwater harvesting pilot projects as:

Rainwater harvesting pilot projects collect precipitation from rooftops and other impermeable surfaces for non-potable uses. Pilot projects must be designed such that data collection supports the purposes identified in Section 37-60-115(6)(a), C.R.S. and further evaluates water conservation potential through pairing rainwater harvesting with advanced⁴ outdoor water demand management. Projects must be located in new residential or mixed-use development.⁵

The goal of the pilot project program is to gain additional field-verified information about the feasibility of rainwater harvesting as a water conservation measure in Colorado. The purpose of the pilot projects, as described in Section 37-60-115(6)(a) of the Colorado Revised Statutes (C.R.S.), shall be to:

- (I) Evaluate the technical ability to reasonably quantify the site-specific amount of precipitation that, under preexisting, natural vegetation conditions, accrues to the natural stream system via surface and ground water return flows;
- (II) Create a baseline set of data and sound, transferable methodologies for measuring local weather and precipitation patterns that account for variation in hydrology and precipitation event intensity, frequency, and duration, quantifying preexisting, natural vegetation consumption, measuring precipitation return flow amounts, identifying surface versus ground water return flow splits, and identifying delayed ground water return flow timing to receiving streams;
- (III) Evaluate a variety of precipitation harvesting system designs;

- (IV) Measure precipitation capture efficiencies;
- (V) Quantify the amount of precipitation that must be augmented to prevent injury to decreed water rights;
- (VI) Compile and analyze the data collected; and
- (VII) Provide data to allow sponsors to adjudicate permanent augmentation plans as specified in paragraph (c) of this subsection (6).

The specific authorizing legislation for the pilot project program is attached. The following Criteria and Guidelines have been developed pursuant to Section 37-60-115(6), C.R.S. and are adopted by the CWCB.

NOTE:

The Act limited the CWCB's ability to spend money to implement the Act. **As a result, only those applicants and the fees paid that fall within the Board's authorized spending authority shall be selected.** The CWCB indicated that the spending authority granted by H.B. 09-1129 would be a limiting factor in selecting and awarding projects. The Board will consider the need for the submission of a future budget Change Request if it determines such a request is needed.

APPLICATION ELIGIBILITY REQUIREMENTS AND PROCESS

These Criteria and Guidelines provide guidance for the pilot project application and approval process. As stated in the previous section, the goal of the pilot projects is to gain information about rainwater harvesting as a water conservation measure in Colorado. H.B. 09-1129 identified additional objectives toward advancing the understanding of potential water rights impacts from rainwater harvesting in Colorado. Rainwater harvesting pilot projects must operate according to a Substitute Water Supply Plan (SWSP) approved annually by the state engineer pursuant to Section 37-92-308(4) or (5), C.R.S. Sponsors are required to replace an amount of water equal to the precipitation captured and measured from rooftops and impermeable surfaces. After a minimum of two years of data collection, pilot project sponsors may apply to the appropriate water court for a permanent augmentation plan or file a plan with the State Engineer to permanently retire the rainwater collection system, which plan must be reviewed and approved prior to the cessation of augmentation. In the water court application for an augmentation plan, and in the associated SWSP, the sponsor may apply to reduce the augmentation obligation by an amount equal to the historical consumptive use from preexisting, natural vegetation cover.

The CWCB, in consultation with the State Engineer, shall consider all Eligibility Requirements, as described below, in evaluating pilot project proposals. As required under Section 37-60-115(6)(b)(V), C.R.S., **priority shall be given to projects that a) are located in areas that face renewable water supply challenges and b) promote water conservation.** Approval for an SWSP⁶ and water court decree is a separate process and is not explicitly addressed in these Criteria and Guidelines.

Eligibility Requirements

For an applicant to be eligible for the pilot project program, it must meet the requirements described in this section. Only projects associated with new development are eligible; no applications for existing structures or development will be considered. Proposals for rainwater harvesting pilot projects must include:

1. Pilot project sponsor information including:
 - a. The name and contact information of the pilot project sponsor.
 - b. A description of how the pilot project sponsor qualifies as an applicant for a new development as defined in Section 29-20-103, C.R.S., for a new planned unit development or new subdivision of residential housing or mixed uses.
 - c. A list of the organizations and/or individuals including those hired or otherwise retained by the entity that will assist in development and implementation of the pilot project and analysis of data, including a written statement of their role and contributions. Applicant must demonstrate its commitment to carrying out the goals of the pilot project through demonstrating adequate staffing (paid or volunteered, in-house or outsourced, consultants, advisors, etc.) and a commitment to make the applicant's resources available to carry out the pilot project.
2. An application fee of \$4,000 and demonstration of ability to provide an annual review fee of \$7,000 throughout the pilot project, per Section 37-60-115(6)(b)(I), C.R.S. H.B. 09-1129 limited the CWCB's ability to spend money to implement the Act. **As a result, only those applicants and the fees paid that fall within the Board's authorized spending authority shall be selected.** The CWCB indicated that the spending authority granted by H.B. 09-1129 would be a limiting factor in selecting and awarding projects. The Board will consider the need for the submission of a future budget Change Request if it determines such a request is needed.
3. A description of the proposed new development, per Section 37-60-115(6)(b)(II), C.R.S., including:
 - a. Description of the current conditions of the project site, and
 - b. Project location map, including identification of location within a Water Division as established in Section 37-92-201, C.R.S., watershed boundaries and other pertinent geographic and hydrologic information, per Section 37-60-115(6)(b)(III), C.R.S.,
4. A description of the proposed rainwater harvesting collection system, per Section 37-60-115(6)(b)(II), C.R.S., including:
 - a. Description of the collection system design,
 - b. Estimated volume of water to be captured on an average monthly basis,
 - c. Method for measuring capture efficiencies,
 - d. Estimated infrastructure and ongoing operations and maintenance costs associated with implementing the system, and

- e. Estimated cost to implement rainwater harvesting system per acre-foot of water saved. Considerations should include: institutional, legal, technical/design, infrastructure, and augmentation water supply. Potential cost savings and benefits associated with the project should also be quantified: reduced water rights acquisition, reduced storm water system sizing, water quality benefits, etc.
- 5. A description of how the proposed development meets any applicable local government water supply requirement through sources other than precipitation harvesting, per Section 37-60-115(6)(b)(IV), C.R.S.
- 6. A description of renewable water supply challenges for the area, per Section 37-60-115(6)(b)(V)(A), C.R.S. Indicate how the proposed project addresses key water needs identified in the Statewide Water Supply Initiative or as identified in the basins' needs assessment and offers opportunity to collect information from a variety of geographic and hydrologic areas throughout the state. Preference may be given to projects that address larger water supply needs or in locations with critical water supply challenges.
- 7. A description of how the rainwater harvesting pilot project will promote and implement water conservation, per Section 37-60-115(6)(b)(V)(B), C.R.S., including:
 - a. Description of how the project promotes water conservation through pairing rainwater harvesting with advanced outdoor water management techniques, including:
 - i. Overall landscape and irrigation design philosophy.
 - ii. Homeowner/community water conservation education philosophy.
 - b. Description of metrics that will be used to quantify water usage and an estimate of the projected water savings through rainwater harvesting paired with advanced outdoor water management techniques. These shall include but not be limited to:
 - i. Landscape plans: square footage of irrigated and non-irrigated landscape for common areas and individual homes, description and quantification of landscape plantings for common areas and individual homes, estimated average annual demand in gallons per square foot based on historical evapotranspiration rates (water budgets). Landscape plans should reference the *GreenCO BMP Manual*⁷ for best practice guidance.
 - ii. Design plans of irrigation systems including, but not limited to, emitter types, controller type, rain sensor and meter type for measuring use of water from the rainwater harvesting collection system. An irrigation audit should be performed within the first season of operation. Irrigation plans should reference the *GreenCO BMP Manual* for best practice guidance.
 - iii. Landscape management plan to include watering schedule, water budget, maintenance schedules, and other ongoing management aspects. Landscape management plans should reference the *GreenCO BMP Manual* for best practice guidance.
 - iv. Connection(s) between the rainwater harvesting collection system and irrigation system should be fully metered. At a minimum, sponsors shall consider AMI (advanced metering infrastructure) with an indoor radio

- frequency unit and/or “dashboard “for immediate feedback to pilot project sponsors on impacts from water management decisions.
- v. Description of homeowner/community water conservation education campaign and training program (i.e. how will the pilot project sponsor support and assist homeowners, community members, and maintenance personnel to make the best water management decisions). These educational programs should be comprehensive to include indoor and outdoor water demand management, water supply, and water quality education.
8. A description of how the rainwater harvesting pilot project will meet the purposes of the rainwater harvesting pilot program per Section 37-60-115(6)(a), C.R.S. Data collection, reporting, and analysis methods may include but not be limited to:
- a. Determining local weather and precipitation patterns that account for variations in hydrology and precipitation event intensity, frequency, and duration,
 - b. Quantifying preexisting, natural vegetation consumption,
 - c. Measuring precipitation return flow amounts,
 - d. Identifying surface water versus ground water return flow splits
 - e. Identifying delayed ground water return flow timing to receiving streams, and
 - f. Quantifying the amount of precipitation that must be augmented to prevent injury to decreed water rights.
9. A summary of an SWSP application that demonstrates the applicant can meet the requirements of the *General Guidelines for Substitute Water Supply Plans Submitted to the State Engineer Pursuant to Section 37-92-308, C.R.S. (2003)*. The summary shall contain, at a minimum, an explanation of how the applicant will engage resources necessary to determine 1) the maximum amount of precipitation that will be captured during the year, 2) the timing with which that entire amount of precipitation would accrue to the stream system through overland flow and deep percolation, 3) the potential sources of replacement water that will be available to replace those depletions at the appropriate locations, and 4) how the plan will be operated. The CWCB will not consider a pilot project for selection if, in consultation with the State Engineer, it determines that the applicant does not have the resources to develop a viable SWSP for approval.

Process

Section 37-60-115(6), C.R.S. establishes certain processes and obligations for pilot project sponsors as well as the CWCB, in consultation with the State Engineer, as further described in this section. H.B. 09-1129 limited the CWCB’s ability to spend money to implement the Act. **As a result, only those applicants and the fees paid that fall within the Board’s authorized spending authority shall be selected.** The CWCB indicated that the spending authority granted by H.B. 09-1129 would be a limiting factor in selecting and awarding projects. The Board will consider the need for the submission of a future budget Change Request if it determines such a request is needed.

A. Pilot Project Sponsors

- i. Prospective pilot project sponsors shall submit proposals meeting the Eligibility Requirements described above, along with the application fee, to the CWCB annually by March 1. Per Section 37-60-115(6)(b)(III), an applicant that meets the Eligibility Requirements may apply to become a sponsor of one or more of the ten pilot projects, however no more than three pilot projects may be located within any single Water Division established in Section 37-92-201, C.R.S.
- ii. Pilot projects authorized by the Board may begin collecting rainwater upon approval of an SWSP. Pilot project sponsors must operate according to an SWSP⁸, if approved annually by the State Engineer pursuant to Section 37-92-308(4) or (5), C.R.S.
- iii. Pilot project sponsors shall provide an annual preliminary report to the Board and State Engineer throughout the term of the pilot project, until a water court decree is obtained or a cessation plan is approved by the State Engineer, per Section 37-60-115(6)(d), C.R.S. Annual reports and review fees shall be due annually on July 1, unless otherwise authorized by the CWCB. Annual reports shall summarize the information set forth in Section 37-60-115(6)(a), C.R.S. and indicate how data and findings address the pilot project program goals, including:
 - a) Variances from original project as conceptualized at the time of the pilot project program application.
 - b) Rainwater harvesting system performance including final collection system design and operations and maintenance issues; estimated capture efficiency; amount of water captured; infrastructure, operations, and maintenance costs; estimated cost to implement rainwater harvesting system per acre-foot of water saved, and comparison of original projected and actual costs from implementing rainwater harvesting systems. Considerations should include: institutional, legal, technical/design, infrastructure, and augmentation water supply.
 - c) Water conservation – water savings through pairing rainwater harvesting with advanced outdoor water management. Information shall include but not be limited to: total annual metered water use from the rainwater collection system and use by category if application varies (e.g. different irrigation systems), actual consumptive use by category of use; actual irrigation consumption vs. estimated water budgets; indoor annual consumption; landscape maintenance assessment (i.e. quality of landscape, maintenance issues, replacement plantings), and irrigation system audit results and corresponding actions.
 - d) Water rights – summary of data collected toward providing information about the technical ability to reasonably quantify the site-specific amount of precipitation that, under preexisting, natural vegetation conditions, accrues to the natural stream system via surface and ground water return flows; create a baseline set of data and sound, transferable methodologies for measuring local weather and precipitation patterns that account for variation in hydrology and precipitation event intensity, frequency, and duration, quantifying preexisting, natural vegetation consumption, measuring precipitation return flow amounts,

identifying surface versus ground water return flow splits, and identifying delayed ground water return flow typing to receiving streams.

- iv. Pilot project sponsors shall submit a final report to the CWCB and State Engineer by January 15, 2019, per Section 37-60-115(6)(d), C.R.S. Final reports shall include a compilation of annual reports and a summary of project findings and conclusions including variations from the pilot project as conceptualized at the time of application to the pilot project program.

B. Colorado Water Conservation Board

- i. The deadline for rainwater harvesting pilot project applications will be March 1 annually.
- ii. CWCB staff, in consultation with the State Engineer, shall have up to 120 days to review and evaluate pilot project proposals, according to the Eligibility Requirements previously described. Pilot project applications that meet the Eligibility Requirements will be placed on the July Board meeting agenda for the Board to consider.
- iii. CWCB staff shall present recommendations to the Board for consideration at the annual July Board meeting, at which time the Board may approve, disapprove, or defer a decision to award a pilot project. Board approval will be contingent to SWSP approval, per Section 37-60-115(6)(c), C.R.S.
- iv. The CWCB and the State Engineer shall brief the Water Resources Review Committee created in Section 37-98-102, C.R.S., on the reported results of the pilot projects by July 1, 2014 and shall provide a final briefing to the Water Resources Review Committee by July 1, 2019, per Section 37-60-115(6)(d), C.R.S..

All approved applications and reporting under pilot projects will become public record and will be available to the public through the CWCB website. These Criteria and Guidelines do not attempt to provide guidance on the level of detail in data collection/analysis needed to successfully advance a pilot project through the SWSP process or water court. It is anticipated that such requirements may vary depending on the size and type of rainwater harvesting system, project location, and resulting impact on the stream system. It is the pilot project sponsor's responsibility to determine the appropriate level of detail. Further, compliance with these Criteria and Guidelines does not ensure an SWSP or water court application will be approved. These Criteria and Guidelines shall be reviewed and updated as necessary.

¹ Per Section 37-60-115(6)(b), C.R.S., the Board shall establish Criteria and Guidelines for applications and the selection of pilot projects, including the following:

- (I) An application fee and, for pilot projects that are selected, an annual review fee;
- (II) The information to be included in the application, including a description of the proposed development and the proposed precipitation harvesting system;

- (III) Selection of pilot projects to represent a range of project sizes and geographic and hydrologic areas in the state, with no more than three pilot projects being located within any single Water Division as established in Section 37-92-201;
- (IV) The requirement that the proposed development meet any local government water supply requirements through sources other than precipitation harvesting;
- (V) Giving priority to pilot projects that:
 - (A) Are located in areas that face renewable water supply challenges; and
 - (B) Promote water conservation.

² Holistic Approach to Sustainable Water Management in Northwest Douglas County, Prepared by Leonard Rice Engineers, Inc., Meurer & Associates, and Ryley, Carlock & Applewhite, January 2007.

³ The rainwater harvesting pilot project program established under H.B. 09-1129 is separate from Senate Bill 09-80 which authorized limited exemptions for water collected from certain residential rooftops that are served by wells permitted for domestic uses according to Section 37-92-602, C.R.S., and meeting other criteria described under S.B. 09-80.

⁴ CWCB considers advanced outdoor water demand management to include concepts similar to those identified in the *Holistic Approach to Sustainable Water Management in Northwest Douglas County* that reduce outdoor water demands and improve application efficiency.

⁵ Per 37-60-115(6)(b), an application for a development permit, as that term is defined in Section 29-20-103, C.R.S., for a new planned unit development or new subdivision of residential housing or mixed uses may submit an application the Board to become a sponsor of one or more of the ten pilot projects.

⁶ For additional information, see Division of Water Resources Policy 2003-2, *Implementation of Section 37-92-308, C.R.S. (2003) Regarding Substitute Water Supply Plans*, and the Attachment to Policy 2003-2, *General Guidelines for Substitute Water Supply Plans Submitted to the State Engineer Pursuant to Section 37-92-308, C.R.S. (2003)*.

⁷ Green Industry Best Management Practices (BMPs) for the Conservation and Protection of Water Resources in Colorado: Moving Toward Sustainability, 3rd Release, Prepared by Wright Water Engineers, Inc. for Green Industries of Colorado (GreenCO), May 2008.

⁸ The following State Engineer approval is described in Section 37-60-115(6)(c), C.R.S.:
Notwithstanding any limitations regarding phreatophytes or impermeable surfaces that would otherwise apply pursuant to Section 37-92-103 (9) OR 37-92-501(4) (b) (III), each of the ten pilot projects shall:

- (I) During the term of the pilot project, operate according to a Substitute Water Supply Plan, if approved annually by the State Engineer pursuant to Section 37-92-308 (4) OR (5). Until the pilot project sponsor applies to the water court for a permanent augmentation plan, the pilot project shall be required to replace an amount of water equal to the amount of precipitation captured and measured from rooftops and impermeable surfaces for nonpotable uses.
- (II)
 - (A) Apply to the appropriate water court for a permanent augmentation plan prior to completion of the pilot project or file with the State Engineer to permanently retire the rainwater collection system, which plan shall be reviewed and approved prior to the cessation of augmentation. As a condition of approving retirement of a pilot project, the State Engineer shall have the authority to require the project sponsor to replace any ongoing delayed depletions caused by the pilot project after the project has ceased. Any such permanent augmentation plan shall entitle the sponsor to consume without replacement only that portion of the precipitation that the sponsor proves by a preponderance of the evidence would not have accrued to the natural stream under preexisting, natural vegetation conditions. The sponsor shall be required to fully augment any precipitation captured out of priority that would otherwise have accrued to the natural stream.

(B) After a minimum of two years of data collection and upon application to the appropriate water court for a permanent augmentation plan, the pilot project sponsor shall file an application for approval of a substitute water supply plan pursuant to Section 37-92-308 (4). For any substitute supply plan application filed under Section, a pilot project sponsor may seek approval from the State Engineer based on replacing only the net depletion caused by the capture of precipitation. The net depletion shall be calculated as the amount of precipitation captured minus the historical consumptive use from preexisting, natural vegetation cover on the impermeable area as demonstrated by analysis of the data collected by the sponsor during the pilot project.