Colorado Water Conservation Board

Water Plan Grant Application

Instructions

To receive funding for a Water Plan Grant, applicant must demonstrate how the project, activity, or process (collectively referred to as "project") funded by the CWCB will help meet the measurable objectives and critical actions in the Water Plan. Grant guidelines are available on the CWCB website.

If you have questions, please contact CWCB at (303) 866-3441 or email the following staff to assist you with applications in the following areas:

Supply and Demand Gap Projects: Rebecca.Mitchell@state.co.us

Water Storage Projects: Anna.Mauss@state.co.us

Conservation, Land Use Planning: Kevin.Reidy@state.co.us

Education & Innovation Activities: Mara.MacKillop@state.co.us

Agricultural Projects: Gregory.Johnson@state.co.us

Environmental & Recreation Projects: Linda.Bassi@state.co.us

Applicants interested in submitting an 'Intent to Apply' in the future are encouraged to check he ☐ and fill in all sections with the best information available at the time. Exhibits excluded.

This "Intent to Apply" will help CWCB prioritize Projects that are not ready for fully completed Water Plan Grant Application due to the initial timeframe and deadlines required.

Water Project Summary

Name of Applicant	Geothermal Greenhouse Partnership, Inc.
Name of Water Project	Community Garden and Innovation Greenhouses

CWP Grant Request Amount	$174,500
Other Funding Sources CO Garden Foundation	$34,000
Other Funding Sources Aquaponic professionals	$50,000
Applicant Funding Contribution	
Total Project Cost	$258,500

Applicant & Grantee Information	
Name of Grantee(s)	Geothermal Greenhouse Partnership
Mailing Address	PO Box 5333, Pagosa Springs, CO 81147
FEIN	45-4786340
Organization Contact	Sally High
Position/Title	GGP Board President
Email	sallymhigh@gmail.com
Phone	(970) 799-1693
Grant Management Contact	Pauline Benetti
Position/Title	GGP Board VP
Email	paulineb@centurytel.net
Phone	(970)264-5232
Name of Applicant (if different than grantee)	NA
Mailing Address	
Position/Title	
Email	
Phone	

Description of Grantee/Applicant
Provide a brief description of the grantee's organization (100 words or less).
The Geothermal Greenhouse Partnership (GGP) is a collaborative group of community members and organizations who since 2009 have been focused on: 1) using our abundant geothermal and solar resources to grow food year-round for consumption and sale, 2) teaching the principles of sustainable agriculture and the use of renewable energy resources to the community, 3) engaging the community in the 21st century agricultural challenge involving the intersection and future of water, food and renewable energy. Collaboration with the Town of Pagosa Springs ensured the project land (.7 acres) and water (100 gpm) in 2012. The same year, GGP became an educational 501c3 corporation. The Board of Directors and its committees continue to keep the fire burning over the long haul, building local, regional and state-wide relationships and acquiring funding. Now with real physical work to be done community involvement is phenomenal – plumbers, electricians, carpenters, laborers, gardeners, event planners, etc. This year, we celebrate a productive greenhouse with a revenue stream, educational programming underway, our 5th Annual Pagosa Environmental Film Festival, our inaugural San Juan Sounds Concert Series and our 2nd annual Breakfast with Balloons event. Completed, our vision includes three domes, Education (complete), Community, and Innovation, outside gardens (both vegetable and ornamental), and the unique garden amphitheater (complete) and will fulfill our mission in the following four areas: Water Use and efficiency: Water has both consumptive and non-consumptive uses in this project. The river provides consumptive irrigation water for the project and the closed-loop geothermal heating system comprises the non-consumptive use. Equally important is the water savings from the greenhouse. Agriculture in closed structures, such as domes, results in significantly less evaporative loss. Plus, with the addition of drip systems, water is used more efficiently yielding more crop per gallon. Education and Conservation: All three domes are dedicated to educating children and adults in the principles and practices of water conservation. The Education Dome brings teachers, youth and curricula together for hands-on practice with the resulting produce to be taken home by students. Life Long Learning workshops involve adults in the study of such topics as permaculture, xeric landscaping, a healthy river, greenhouse growing, wise use of water, and environmental conservation. Transfer of Technology and Philosophy: While the Education and Community Domes allow us to teach and grow without interruption year-round, most citizens do not have access to such a facility. For that reason, we include an outside Community Garden. Here participants will be able to transfer knowledge about water use and efficiency to an experience which they can replicate at home. Incidental transfer occurs even now as visitors using the River Walk are brought into the GGP Park and often stop at the Education Dome to see what is going on. Volunteers in the Dome field questions regarding water use, energy conservation, crops and soil. Not infrequently, these are non-local visitors and carry information and inspiration away with them. Economic Development in Rural Colorado: The Geothermal Greenhouse Partnership is an Enterprise Zone project in an economically challenged downtown. Revitalization of Pagosa Springs' downtown is an economic development goal shared by the town and county. More than half of Archuleta Schools' students qualify for free and reduced lunches. GGP is teaching self-reliance and vegetable production, but also job skills that point students toward choices of careers in a sustainable future. Pagosa's economy is largely based on tourism and the GGP park draws tourists and revenue. Already in our first year of operation, we are hosting dozens of out-of-towners.

Type of Eligible Entity (check one)	
	Public (Government): Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.
	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
	Private Incorporated: Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
X	**Non-governmental organizations (NGO):** Organization that is not part of the government and is non-profit in nature.
	Covered Entity: As defined in Section 37-60-126 Colorado Revised Statutes.

Type of Water Project (check all that apply)	
	Study
X	Construction
	Identified Process or Program
	Other

Category of Water Project (check all that apply)		
	Supply and Demand Gap Projects - Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap. (Applicable Exhibit A Task(s) _____)	
	Water Storage Projects - Projects that facilitate the development of additional storage, artificial recharge into aquifers, and dredging existing reservoirs to restore the reservoirs' full decreed storage capacity. (Applicable Exhibit A Task(s) _____)	
	Conservation and Land Use Planning Projects - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. (Applicable Exhibit A Task(s) _____)	
X	Engagement & Innovation Projects - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application available on the website. (Applicable Exhibit A Task(s) _____)	
	Agricultural Projects - Projects that provide technical assistance and improve agricultural efficiency. (Applicable Exhibit A Task(s) _____)	
	Environmental & Recreation Projects – Projects that promote watershed health, environmental health, and recreation. (Applicable Exhibit A Task(s) _____)	
	Other	Explain:

Location of Water Project	
Please provide the general county and coordinates of the proposed project below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	Archuleta County
Latitude	37.1604° N
Longitude	107.0067° W

Water Project Overview
Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain. The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule.
CWCB funding will be used to construct and build-out the Community and Innovation Domes, facilitating the following community and regional outreach, education and innovation activities: <u>The Community Dome</u> Inquiries have come from diverse organizations seeking to know how they might be involved in our project. Thus was born the idea of giving community organizations growing space to fulfill their specific goals simultaneously achieving our own goal, *Growing food and community with local energy*, anchored in water conservation principles. A small sampling of interested groups include Vets for Vets (providing constructive and instructive activities); the Sheriff's Office (providing training/constructive activities); Victim's Assistance (providing food and a healing experience. These groups working together in the greenhouse, will advance their interests in the community and reap the potential benefits of collaboration and cooperation. Most importantly to our mission, they will be reaching populations of the community that are most in need of and least available, with lessons in sustainability. An understanding of conservation of Colorado's water in the 21st century will be embedded in the many experiences offered in the Dome. <u>The Innovation Dome</u> The Innovation Dome will be an aquaponic growing environment, demonstrating high yields of food and extreme water conservation. While all greenhouse growing saves water, a closed loop aquaponic greenhouse conserves over 90% of the water consumed in conventional soil growing. Aquaponics is a growing technique involving raising both fish and vegetables in a closed loop system. The Innovation Greenhouse will provide an ongoing income stream to the nonprofit. The produce will be sold to local restaurants and markets. Workshops in 21st Century Sustainable Agriculture will draw locals and outsiders to Pagosa Springs to study these proven water-conservative growing techniques. The Innovation Dome will be open to the public for learning opportunities only a day or two each month. Clear windows will allow observation from the outside. Bio-security and safe food practices will be of paramount importance. The GGP Park in Pagosa Springs will become a touchstone for learning about the intersection and future of water, food and renewable energy.

Measurable Results		
To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:		
	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
N/A. Applicable later.	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
	Area of Restored or Preserved Habitat (acres)	
	Quantity of Water Shared through Alternative Transfer Mechanisms	
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning	
	Other	Explain:

Water Project Justification
Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers). The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)

The stated goals of the Colorado Water Conservation Board's (CWCB) Colorado Water Plan (CWP) "are to meet the water supply gap, defend Colorado's compact entitlements, improve regulatory processes, and explore financial incentives—all while honoring Colorado's water values and ensuring that the state's most valuable resource is protected and available for generations to come" (CWCB, 2015, p. 1.12). This Geothermal Greenhouse Partnership (GGP) Project supports the CWP goal to help meet the state's projected 2050 water supply gap of 560,000 acre feet (AF; p. 1.9). The GGP Project will work toward narrowing that gap by using a water right to develop a beneficial- and multi-use agricultural project, as well as an environmental education project. In addition, water savings from the GGP Project will result from the closed-system dome structures, which significantly reduces evaporative losses. Moreover, the use of drip irrigation systems requires less water and yields more crops per gallon. In general, growing domes use 1/3 less water than conventional methods.

The Statewide Water Supply Initiative (SWSI) was developed in 2004 by the CWCB. Similar to the CWP, the goals of each of the SWSI initiatives was to comprehensively identify Colorado's current and future water needs to the year 2030. The most recent SWSI initiative determined that "Colorado will need between 600,000 and 1 million acre-feet/year of additional municipal and industrial (M&I) water by 2050" (CWCB, 2010, p. 3). Therefore, and similar to the gap narrowing and water saving benefits discussed above, this GGP Project also supports the SWSI goals to help meet the state's projected water supply and demand gaps.

The GGP Project supports the goals of Southwest Basin Roundtable (SBR) Basin Implementation Plan (BIP) under the heading of *New Multi-Purpose, Cooperative, and Regional Projects & Processes* (CWCB, 2015a, p. 92). As previously referenced, this GGP Project uses a water right to develop a beneficial- and multi-use agricultural project, as well as an environmental education project. Additional multi-purpose benefits of the GGP Project include:

- Demonstrating water conservation methods and practices.
- Growing food locally using sustainable agricultural practices.
- Promoting community engagement that supports communication, education, outreach, and public participation efforts related to water and horticulture.
- Providing economic development benefits.[1]
- Supporting innovation efforts that advance water ecosystems such as aquaponic and hydroponic growing environments (with produce sold to local restaurants and markets), while also demonstrating high yields of food and extreme water conservation[2].
- Utilizing renewable, geothermal energy to grow food at high altitudes.

The cooperative and regional nature of the GGP Project includes relationships with and support from local, national, non-profit, private, public, regional, and state entities such as:

[1] The GGP Project is an Enterprise Zone Project in downtown Pagosa Springs. Revitalization of the downtown district is an economic development goal shared by the town and county. The town's economy is based on tourism and the GGP Project draws tourists and revenue from around the world. More than half of Archuleta Schools' students qualify for free and reduced lunches. The GGP Project teaches not only self-reliance and food production, but also provides students with agriculture-related job skills.

[2] Closed loop aquaponic greenhouses conserve over 90% of the water consumed in conventional soil growing.

- Archuleta County Board of County Commissioners
- Archuleta County Seniors, Inc. and Area Agency on Aging
- Archuleta County Sheriff's Office
- Archuleta School District 50 Jt.
- Audubon Weminuche Chapter
- Audubon Rockies
- Ballantine Family Fund
- Chama Peak Land Alliance
- Colorado Alliance for Environmental Education
- Colorado Department of Agriculture
- Colorado Department of Local Affairs
- Colorado Energy Office
- Colorado Environmental Education Leadership Council
- Colorado Environmental Film Festival
- Colorado Health Foundation
- Colorado School of Mines
- Colorado Senator Gail Schwartz (former)
- Colorado Representative Barbara McLachlan (current)
- Colorado State University Extension Service
- Colorado Water Conservation Board
- Community Foundation Serving Southwest Colorado
- Courtney King Architect
- Davis Engineering Services
- Four Corners Office for Resource Efficiency
- Governor John Hickenlooper
- Growing Spaces
- Pagosa Homeschool Connection
- Laura Jane Musser Foundation
- Livewell Colorado
- Numerous local churches
- Pagosa Area Water and Sanitation District
- Pagosa Mountain Morning Rotary
- Pagosa Springs Farmer's Market
- Pagosa Springs Town Council
- Pagosa Verde
- Region 9 Economic Development District
- San Juan Headwaters Forest Health Partnership
- San Juan Water Conservancy District
- Southwest Basin Roundtable
- Southwest Organization for Sustainability
- Southwestern Water Conservation District
- U.S. Environmental Protection Agency
- U.S. Congressman Scott Tipton (current)
- U.S. Senator Mark Udall (former)
- U.S. Senator Michael Bennett (current)
- Vets for Vets
- Rise Above Violence (Victim's Assistance Program)

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The GGP Project supports the goals of SBR Public Education and Participation Outreach (PEPO) Plan. This plan includes the following consensus-built priorities:

- Bridge the consumptive and non-consumptive communities while highlighting progressive, **multi-purpose** solutions.
- **Communicate** statewide implications of identified projects and processes.
- **Educate** roundtable members.
- Energize **water education** efforts.
- **Engage diverse stakeholders**.

As indicated in bold above, the GGP Project supports all five identified priorities. The project "supports multi-purpose projects when possible and when they can be accomplished in a manner that is protective of the values present" (CWCB, 2015b, p. 12). The GGP Project has positive statewide implications. The project will become a touchstone not only for state, but regional, national, and global lessons-learned related to the intersection and future of water, food, and renewable energy. Moreover, the GGP Project, with one of its primary goals being education, will not only educate roundtable members but a multitude of additional sectors as well. As an example, all three domes are dedicated to educating children and adults about the principles and practices of water conservation. The Education Dome brings teachers, youth, and curricula together for hands-on practice with the resulting produce to be taken home by students. Life Long Learning workshops involve adults in the study of such topics as permaculture, xeric landscaping, healthy rivers, greenhouse growing, wise use of water, and environmental conservation. Finally, as presented previously, the GGP Project engages a diversity of stakeholders.

All of the GGP Project's education efforts support the CWCB's CWP goals to support outreach, education, public engagement, and innovation in an effort to "enhance Colorado's water communication, outreach, education, and public engagement efforts; advance Colorado's water supply planning process; and support a statewide water innovation ecosystem" (CWCB, 2015, pp. 9.53-9.61). The purpose of the CWCB and GGP efforts are to engage the public in an effort to promote well-informed community understanding and decision-making related to statewide water solutions, support Colorado water innovation, and foster commitments to collaboration and community engagement. The GGP Project is perfectly positioned and in-line with these stated CWCB CWP objectives.

It is our hope that the CWCB will recognize that this GGP Project fits perfectly within the CWP framework for State support of a water project as it aligns with Colorado's water values (CWCB, 2015, 9.43-9.47). As indicated, "the State will use the following criteria to determine alignment with these values" (p. 9-43):

1. *Does the project proponent demonstrate a commitment to collaboration?*
   As indicated previously, the GGP Project addresses more than one type of need—it uses a water right to develop a beneficial- and multi-use agricultural project, as well as an environmental education project. The Project involves multiple participants, which includes local, national, non-profit, private, public, regional, and state entities. As such the GGP Project has consulted with a broad set of local stakeholders and local governments early in the development process and provided a plethora of meaningful opportunities for input (e.g., information sessions, meetings, surveys, work sessions, etc.).
2. *Does the project proponent demonstrate sustainability?*
   Water conservation best practices were described in paragraphs 1 and 2 above. The GGP Project has no adverse effects to environmental or recreational interests. Conversely, environmental and recreational interests are enhanced and supported through this Project when the environmental effects of growing food locally are taken into consideration, plus the recreational benefits of gardening. The GGP Project has no effect, negative or otherwise, on water quality. Moreover, the

Project enhances economic and social impacts related to agriculture and rural communities. As mentioned previously, the GGP Project maximizes the use of an existing water right resource for multiple beneficial and multi-use purposes. The Project proponents are partnering with local governments to incorporate best water use practices into land use planning. As a matter-of-fact, the Archuleta County Water Wise Task Force[3] was recently accepted into the Sonoran Institute's Water and Land Use Planning Workshop being conducted in Keystone in September of this year. Finally, the GGP Project will not affect interstate compacts or curtailments of existing water rights.

3. Does the project proponent establish the fiscal and technical feasibility of the project?

The GGP Project demonstrates over-all cost-effectiveness. The Project incorporates local investments and collaborative contributions. The Project will also leverage this CWCB grant with other funding sources. The GGP Project uses a technically and legally available water supply for the project. Finally, proponents can demonstrate readiness to proceed with this Project based upon receipt of CWCB funding. Engineering and architectural plans and relationships with an established contractor, plumbers and electricians already exist.

References

Colorado Water Conservation Board. (2015). *Colorado water plan*. Denver, CO: Author.

Colorado Water Conservation Board. (2015a). *Southwest Basin Roundtable basin implementation plan*. Denver, CO: Author.

Colorado Water Conservation Board. (2015b). *Southwest Basin Roundtable public education and participation outreach plan*. Retrieved from http://cwcbweblink.state.co.us/weblink/0/doc/198061/Electronic.aspx?searchid=46b9e468-6303-4603-9503-3478a15ee202

Colorado Water Conservation Board. (2010). *SWSI 2010 mission statement, key findings, and recommendations*. Retrieved from http://cwcb.state.co.us/WATER-MANAGEMENT/WATER-SUPPLY-PLANNING/Pages/SWSI2010.aspx

Related Studies
Please provide a list of any related studies, including if the water project is complementary to or assists in the implementation of other CWCB programs.
N/A

[3] Among other entities, this includes Archuleta County, Pagosa Area Water and Sanitation District, San Juan Healthy Forests Partnership, San Juan Water Conservancy District, and the Town of Pagosa Springs.

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Previous CWCB Grants, Loans or Other Funding
List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order; 6) Percentage of other CWCB funding for your overall project.
Current CWCB grant (WSRA & Statewide funds) 1) Geothermal Greenhouse Partnership, Inc, 2) PDAA 2500 SW Geothermal Greenhouse Partnership project 3) San Juan Basin Roundtable 4) March 18, 2015 5) POGG1 PDAA 20150000000000000252 6) 0%

Taxpayer Bill of Rights
The Taxpayer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect your application.
N/A

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Submittal Checklist	
X	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
X	Statement of Work(1)
X	Budget & Schedule(1) *(Spreadsheet)*
X	Letters of Matching and/or Pending 3rd Party Commitments(1)
Exhibit C	
X	Map(1)
X	Photos/Drawings/Reports
X	Letters of Support (Support letter from Basin Roundtable encouraged)
X	Certificate of Insurance (General, Auto, & Workers' Comp.)
X	Certificate of Good Standing with Colorado Secretary of State(2)
	W-9(2)
	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	
X	Engagement & Innovation Supplemental Application(1)

(1) Required with application.
(2) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

ENGAGEMENT & INNOVATION GRANT FUND SUPPLEMENTAL APPLICATION

Introduction & Purpose

Colorado's Water Plan calls for an outreach, education, public engagement, and innovation grant fund in Chapter 9.5.

The overall goal of the Engagement & Innovation Grant Fund is to enhance Colorado's water communication, outreach, education, and public engagement efforts; advance Colorado's water supply planning process; and support a statewide water innovation ecosystem.

The grant fund aims to engage the public to promote well-informed community discourse regarding balanced water solutions statewide. The grant fund aims to support water innovation in Colorado. The grant fund prioritizes measuring and evaluating the success of programs, projects, and initiatives. The grant fund prioritizes efforts designed using research, data, and best practices. The grant fund prioritizes a commitment to collaboration and community engagement. The grant fund will support local and statewide efforts.

The grant fund is divided into two tracks: engagement and innovation. The Engagement Track supports education, outreach, communication, and public participation efforts related to water. The Innovation Track supports efforts that advance the water innovation ecosystem in Colorado.

Application Questions
*The grant fund request is referred to as "project" in this application.
Overview (answer for both tracks)
In a few sentences, what is the overall goal of this project? How does it achieve the stated purpose of this grant fund (above)?
GGP is an educational 501c3. "Our mission is to educate the community in sustainable agricultural practices by producing food year-round using local renewable energy." The goal of this GGP project is to teach about the nexus of water conservation, sustainable agriculture and renewable energy in the 21st Century. The GGP will demonstrate the viability of these concepts in 3 growing dome greenhouses. Three themes define the purposes of the 3 greenhouses: Education, Community and Innovation. The Education Greenhouse is completed and operational, serving local youth and adults. The Community Garden Dome and the Innovation Dome will be completed with funds from this Colorado Water Plan grant, if successful.
Who is/are the target audience(s)? How will you reach them? How will you involve the community?
The completion of the GGP park will facilitate the attraction of audiences from the local community and from a wider geographic area than Pagosa Springs. Residents of southwest Colorado, the southern San Juan Mountains, the Four Corners, and statewide are target audiences that will benefit from water education in the GGP park. Pagosa Springs is the first community downstream from the headwaters of the San Juan River and an ideal location for sharpening the public's understanding of the value of our water. In cooperation with various water education groups, the citizens of Colorado may use the GGP park in the future. In our first year, a steady stream of tourists already use Pagosa's San Juan River Walk to access the Education Dome and learn of our mission and goals. With the Community garden Dome, GGP will engage local civic and service organizations to share vegetable beds with their clients and accomplish their goals as we accomplish ours – "growing food and community with local energy."

Overview (answer for both tracks)
GGP reaches interested participants through various media. Our website, www.pagosagreen.org, and FaceBook page, www.facebook.com/geothermalgreenhousepartnership, are well traveled. We use group emails to reach our databases of members, volunteers and other interested parties. The Pagosa Sun Newspaper and its related periodicals regularly feature the GGP project's programs. The on-line news blogs, Pagosa Daily Post and Pagosa.com publish GGP's press releases and link to our website. We use local radio stations, KWUF and KSUT Public Radio, to promote our events and workshops. The Durango Herald has featured the GGP's Environmental Film Festival Caravan and the award-winning documentaries it brings to southwest Colorado. GGP lists its events on local and regional calendars well in advance of the activity date. Colorado Biz Magazine featured the GGP in the July 2017 issue ("Ag Goes Geothermal in Pagosa Springs," Peterson, Eric, Colorado Biz, p. 9). The GGP project has been presented as an environmental education model at the National Council for the Social Studies National Conference, the Green Schools National Conference and numerous Colorado Alliance for Environmental Education conferences. The second Community Appreciation Evening will honor GGP's donors and members in the autumn of 2017. GGP's Board, in collaboration with the local community, is involved in strategic committees that keep the GGP organized and busy fulfilling our mission. Those committees include Landscaping; Seeds, Soil and Water; Programming; Fundraising; and Special Events. A strong spirit of volunteerism is evident in GGP's community involvement, including over 860 volunteer hours thus far this year in the Education Dome alone. We call ourselves "civic entrepreneurs."
Describe how the project is collaborative or engages a diverse group of stakeholders. Who are the partners in the project? Do you have other funding partners or sources?
Stakeholder collaboration is evidenced by the cross-pollination among various educational groups that support GGP's goals and with whom GGP has relationships: Weminuche Audubon, Audubon Rockies, Southwest Organization for Sustainability (SOS), Archuleta School District, Colorado Environmental Film Festival, to name a few. Stakeholders are represented on GGP's Board of Directors: Colorado Environmental Education Leadership Council, SOS and Pagosa Farmers Market, Audubon Rockies, Weminuche Audubon Society, CSU Extension, Town of Pagosa Springs (Mayor, Planning Department and Parks Commission), Archuleta Schools, Southwest Basin Roundtable and San Juan Water Conservancy District. Funders of the GGP to date include: Laura Jan Musser Foundation, CWCB, CO Department of Local Affairs, Town of Pagosa Springs, Archuleta County, Community Foundation Serving Southwest Colorado, Ballantine Family Fund and private businesses. Enterprise Zone donations ($250 or more, cash or in-kind) in 2016 totaled $58,697. GGP is membership-based and in our first year of growing food and teaching in the Education Dome, we are actively seeking individual and sustaining members to partner in our operations. Vegetable sales from the site and at the Pagosa Farmers Market add to our income. Colorado Water Plan states that "Local involvement, stakeholder consultation, innovative practices, and multiple uses will be integral to future successful projects and processes (CWP p. 8-8)." GGP's project exemplifies the spirit of collaboration in its planning and execution. A few of the regional organizations with whom GGP hopes to partner to provide education related to the Colorado Water Plan are: Trout Unlimited; San Juan Headwaters Forest Health Partnership; Audubon Western Rivers Action Network; Community Collaborative Rain, Hail and Snow Network (CoCoRaHS); The Nature Conservancy; and Colorado Foundation for Water Education. Future partnerships with relevant state-wide organizations that will be fostered include: Project WET, Colorado WaterWise, Alliance for Water Efficiency, Western Resources Advocates, American

Overview (answer for both tracks)
Water Works Association, Water Research Foundation. (CWP, p. 6-73) These water-focused groups can help educate and advance conservation innovations and research, and may share their expertise in classroom or GGP workshop settings. Refer to page 8 of GGP's Water Plan Grant Application for a complete list of supportive partners.
Describe how you plan to measure and evaluate the success and impact of the project?
The impact of the GGP project is being measured by participation in educational activities, number of volunteer hours, and number of visitors to the Education Dome. Evaluation of the success of the project will involve quantification of food produced, water consumed in food production, and participants in growing and learning. When the project is complete, water meters will be installed in each of the 3 greenhouses. GGP will standardize methods of reliably measuring water consumption so that valid comparisons among growing methods can be made. The impact of the project will be evidenced by numbers of learners who engage in water education workshops, special events and classroom participation.
What research, evidence, and data support your project?
The Water Education Task Force (WETF), a collaboration among CWCB, the PEPO Workgroup, Colorado Watershed Network, and Colorado Alliance for Environmental Education, has researched the need for expanded water education in Colorado. WETF's findings recommend a state-wide public education initiative, funding, collaboration, and an increase in Colorado Department of Education's K-12 "water resource content" at the classroom level. (CWP pg. 9-54) Their findings and recommendations strongly support and coincide with GGP's mission. The Colorado Water Plan is based on countless scientific studies into the present health and projected future of Colorado's water resources. "Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation," (Report for the CWCB, pp. 94 – 102) lists valuable relevant research publications. The following list of publications specifically references water conservation in aquaponics, relevant to GGP's Innovation Dome. Typically, these studies report approximately 90% water savings over conventional soil growing. - "Challenges of Sustainable and Commercial Aquaponics," Goddek, Simon et al. Sustainable, April 2015, pp. 4199-4224. - "Model of an aquaponics system for minimized water, energy and nitrogen requirements," Lastiri, D.R. et al. Water Science and Technology, 2016, no page number. - "Commercial aquaponic production and profitability: Findings from an international survey," Love, David C. Aquaculture, Volume 435, 1 January 2015, pp. 67-74. - "Scaling aquaponics systems: Balancing plant uptake with fish output," Buzby, Karen M. et al. Aquacultural Engineering, Volume 63, December 2014, pp. 39-44. - "Recirculating Aquaculture Tank Production Systems: Aquaponics – Integrating Fish and Plant Culture," Rakocy, James E. et al. Southern Regional Aquaculture Center Publication No. 454, November 2006. According to Aquaponics Earth (http://digitalcommons.calpoly.edu/eesp/181), an aquaponics system can save up to 99.75% of water used by a sealed continuously recirculating system that recaptures transpired water. Generally, "aquaponics uses 90% less water than conventional farming techniques."

Overview (answer for both tracks)
Anecdotal qualitative studies into the beneficial effects of community gardening abound. These include positive influences on economic revitalization, emotional health, victim empowerment, and a decrease in recidivism among persons formerly incarcerated.
Describe potential short- and long-term challenges with this project.
A short-term challenge facing the GGP park and its organizers is the need for personnel and an end to reliance on all volunteer labor. The organization intends to hire a site manager, at least half time, for the next phase of construction. Volunteer educators, growers, and administrators will continue to donate their time and professional focus to the GGP park, but all recognize the need for an employee. GGP organizers have always planned for an eventual staff of 3. The Innovation Dome will be managed by a grower(s) trained in aquaponics. Related to this short-term challenge is the nonprofit's need for long-term sustaining funds. The GGP will enter a new phase upon completion of the 2 remaining greenhouses, the subject of this grant application. Then the push to raise construction capital will be over. Sustaining funds for operations and maintenance will come from the membership base, individual and corporate donations, and special events, and environmental education grants. Colorado Water Plan recognizes the essential need for continued cooperative funding from the state level to the grass roots. GGP, although small in scale, will pursue "continuing engagement with communities, stakeholders, and basin roundtables." "Continuing this engagement will be important for the next steps regarding project implementation." (CWP p. 8-8)

Please fill out the applicable questions for either the Engagement Track or Innovation Track, unless your project contains elements in both tracks. If a question does not relate to your project, just leave it blank. Please answer each question that relates to your project. Please reference the relevant documents and use chapters and page numbers (Colorado's Water Plan, Basin Implementation Plan, PEPO Education Action Plan, etc.).

Engagement Track
Describe how the project achieves the education, outreach, and public engagement measurable objective set forth in Colorado's Water Plan to "significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys."
Geothermal Greenhouse Partnership's educational goals encompass both the Engagement and Innovation Tracks. GGP is an educational 501c3; "Our mission is to educate the community in sustainable agricultural practices by producing food year-round using local renewable energy." GGP co-sponsored the Pagosa premiere of "The Great Divide" with San Juan Water Conservancy District and the Water Information Program. We have produced 5 local Environmental Film Festivals in collaboration with the Colorado Environmental Film Festival. A few of the water-related documentaries GGP has shown in Pagosa Springs in recent years include "Watershed: Exploring a New Ethic for a New West," "Remains of a River," "The Last One," "Spine of the Continent," "Keep It Grand," "A Plastic Ocean," "Our Desert Farms," "Think Like a Scientist: Boundaries," and "A Love of Place." GGP is co-sponsoring the Pagosa premiere of "An Inconvenient Sequel: Truth to Power" with the Southwest Organization for Sustainability this month. GGP will continue similar efforts in the future.

GGP's Education Dome became operational in November 2016 and began involving and educating youth from Archuleta School District and CSU 4-H in January. Six Lifelong Learning Workshops are being produced in 2017:
5th Annual Environmental Film Festival – April
"Ornithology of a Healthy River" – June
"Trees and Native Plants in Pagosa Springs Parks" (San Juan River Walk) – July
"Entomology of a Healthy River" – August
"Greenhouse Growing" – September
"The Three Sisters at your Thanksgiving Table" (gourmet cooking with native veggies) – November

Public school teachers, charter school teachers and home schoolers are already asking to learn and grow in the Education Dome in the coming 2017-18 school year. GGP's Programming Committee is already planning water education workshops for 2018, in collaboration with Colorado water resource agencies. GGP intends to expand promotion of educational workshops to reach regional audiences and attract residents from southwest Colorado and beyond.

CWCB intends to create a data-based water education plan by updating the Water Education Task Force Report and addressing needs in water education, "geographically and topically." (CWP p. 9-61) Collaboration with the CAEE-affiliated GGP could result in a collection point for data in an often under-counted rural southwest Colorado. GGP is willing to "engage with the Water Education Task Force and existing water educators to reach" this southwest Colorado audience. (CWP, p. H-23)

Describe how the project achieves the other measurable objectives and critical goals and actions laid out in Colorado's Water Plan around the supply and demand gap; conservation; land use; agriculture; storage; watershed health, environment, and recreation; funding; and additional.

The GGP project supports the CWP's goal to narrow the present and projected water gap by using a small portion of the Town of Pagosa Springs' water right to develop a beneficial, efficient and multi-use agricultural project. The organization's mission is "to educate the community in sustainable agricultural practices by producing food year-round using local renewable energy." GGP's educational activities are already making a positive impact in southwest Colorado. Water savings demonstrated in the GGP project result from closed system dome structures, significantly reducing evaporative losses. The use of drip irrigation systems requires less water and yields more crops per gallon. In general, growing domes use 1/3 less water than conventional outdoor growing.

Conservation of natural resources, wise land use and responsible planning, and inter-connectedness of environmental considerations are built into GGP's environmental educational programming. The GGP's location in Pagosa Springs is ideal for consideration and teaching the importance of watershed health. The GGP park is on the banks of the San Juan River in the heart of the first town downhill from its headwaters on the Continental Divide. The San Juan River Walk and the GGP Amphitheater demonstrate responsible shared recreational use and the value of the San Juan River to hot springs bathers, anglers, rafters, birders, vegetable gardeners, and visitors.

The water-saving agricultural practices of the GGP teach and demonstrate sustainability. Indoor vegetable production, outdoor permaculture and xeric landscaping, direct-use geothermal heating, and efficient irrigation systems have been part of the GGP's planning for years before the Education Dome was completed. Now the nonprofit anticipates the construction of the Community Garden and Innovation Domes, and is planning to spread the practices of sustainable agriculture even more widely.

The Colorado Water Plan advocates for collaborative funding and public/private funding, both of which the GGP has achieved as evidenced by the Town's administration of our DoLA grant, building a public bathroom to serve as matching in-kind, $25,000 cash, and the site and water leases. Archuleta County has donated $9,000 cash for the construction of the Ed Dome and initial landscaping. This joint funding and collaborative working relationships proves the success of this public / private

partnership between the visionary nonprofit organization and local governmental agencies. While the GGP does not depend on local government funding in the long term, the confidence given the organization by local governments is undeniable.

Describe how the project achieves the education, outreach, and public engagement goals set forth in the applicable Basin Implementation Plan(s).

The GGP is eager to assist the Southwest Basin Roundtable with "communication, outreach, and public education efforts related to CWP and BIP." (CWP, p. H-23)

The GGP supports the goals of Southwest Basin Roundtable (SBR) Basin Implementation Plan (BIP) under the heading of *New Multi-Purpose, Cooperative, and Regional Projects & Processes* (CWCB, 2015a, p. 92). As previously referenced, the GGP project uses a water right to develop a beneficial- and multi-use agricultural project, as well as an environmental education project. Additional multi-purpose benefits of the GGP Project include:

- Demonstrating water conservation methods and practices.
- Growing food locally using sustainable agricultural practices.
- Promoting community engagement that supports communication, education, outreach, and public participation efforts related to water and horticulture.
- Providing economic development benefits.
- Supporting innovation efforts that advance water ecosystems such as aquaponic and hydroponic growing environments (with produce sold to local restaurants and markets), while also demonstrating high yields of food and extreme water conservation.
- Utilizing renewable, geothermal energy to grow food at high altitudes.

The cooperative and regional nature of the GGP Project includes relationships with and support from local, national, non-profit, private, public, regional, and state entities. See GGP's Water Plan Grant Application page 8 for a list of partnerships.

Describe how the project achieves the basin roundtable's PEPO Education Action Plans.

The GGP Project supports the goals of SBR Public Education and Participation Outreach (PEPO) Plan. PEPO includes the following consensus-built priorities:

- Bridge the consumptive and non-consumptive communities while highlighting progressive, **multi-purpose** solutions.
- **Communicate** statewide implications of identified projects and processes.
- **Educate** roundtable members.
- Energize **water education** efforts.
- **Engage diverse stakeholders**.

As indicated in bold above, the GGP Project supports all five identified priorities. The project "supports multi-purpose projects when possible and when they can be accomplished in a manner that is protective of the values present" (CWCB, 2015b, p. 12). The GGP Project also has positive statewide implications. The project will become a touchstone not only for state, but regional, national, and global lessons-learned related to the intersection and future of water, food, and renewable energy. Moreover, the GGP Project, with one of its primary goals being education, will not only educate roundtable members but a multitude of additional sectors as well. As an example, all three domes are dedicated to educating children and adults about the principles and practices of water conservation. The Education Dome brings teachers, youth, and curricula together for hands-on practice with the resulting produce to be taken home by students. Life Long Learning workshops involve adults in the study of such topics as permaculture, xeric landscaping, healthy rivers, greenhouse growing, wise use of water, and environmental conservation. Finally, as presented previously, the GGP Project engages a

diversity of stakeholders.

Innovation Track
Describe how the project enhances water innovation efforts and supports a water innovation ecosystem in Colorado.
GGP's Innovation Dome enhances and supports innovative water use by demonstrating the reuse of wastewater from one process (aquaculture) as the primary input for the second process (hydroponic vegetable production). This is known as aquaponics. The interaction between these two system components creates a symbiotic ecosystem that minimizes water consumption. ("Recirculating Aquaculture Tank Production Systems: Aquaponics – Integrating Fish and Plant Culture," Dr. James Rakocy et al, Southern Regional Aquaculture Center Publication No. 454) The effluent water from the fish in the aquaculture component provides a nutrient stream for vegetables produced hydroponically. The vegetables essentially clean the water by removing nutrients, and allow the solution to be recirculated back into the aquaculture component (fish tanks). This symbiosis is facilitated by an aquatic microbial ecosystem where ammonia oxidizers play a crucial role. Aquaponics is widely regarded as one of the most water efficient forms of food production, and mitigates environmental discharge (e.g. fertilizer). The system also facilitates organic certification for the vegetables and fish, because production inputs are 100% controlled. GGP's closed loop aquaponics system will provide a working example for this eco-friendly technology that can be replicated on nearly any scale, creating water efficient food production in a year-round geothermally heated environment.
Describe how the project engages/leverages Colorado's innovation community to help solve our state's water challenges.
The Innovation Dome and GGP educators will engage innovators in water conservation through demonstration and instructive workshops. It leverages existing farmers to examine more productive 21st Century growing techniques that also conserve water. Not only does the Innovation Dome utilize waste water from aquaculture to produce vegetables, but it also showcases a proven production system capable of producing far more plants per square foot than conventionally grown field crops, conserving up to 90% to 97% of the water needed to grow those same crops in soil. The United States' average domestic water consumption per person is approximately 100 gallons per day (https://water.usgs.gov/edu/qa-home-percapita.html). In comparison, evapo-transpiration from the dense volume of plants in the GGP Innovation Dome *may* use a 1.5% to 2% of the system's water (approximately 145 gallons) per day. This water consumption is far less than outdoor or indoor soil production for the volume of food produced in the Innovation Dome. Each GGP dome has a 42 foot diameter. The small 1380 square foot growing area will produce approximately 17,500 heads of lettuce annually, an enormous gain compared to the production capability of the same area in traditional seasonal soil culture. In addition, the aquaculture component can produce 5,500 pounds of fish such as Tilapia annually. Production of other slower growing fish species in smaller volumes is also possible. This creates motivation for traditional farmers to adopt more productive and water efficient growing techniques. Innovators in water conservation will be engaged through workshops, tours, and publishing educational resources.
Describe how the project helps advance or develop a solution to a water need identified through

Innovation Track
TAP-IN and other water innovation challenges. What is the problem/need/challenge?
In the context and spirit of Colorado TAP-IN, the problem is water scarcity and the challenge is projected increase in scarcity among various uses and communities in our state. The Colorado Innovation Network (COIN) TAP-IN program calls upon the state's innovation community to collaborate and partner to solve water challenges. TAP-IN aims to support a high-impact water and innovation ecosystem in Colorado that results in action and solutions. The GGP's Innovation Dome offers a scalable solution to the problem of inefficient agricultural water use. A collaborative group of Coloradans has spent years studying various sciences underlying water use and management, widely and deeply. The resulting Colorado Water Plan is now being implemented. Those of us who are implementers can easily interpret the process thus far by using Albert Einstein's one hour analogy: 55 minutes of thinking about it and 5 minutes solving it (http://tapinco.org/). The GGP project demonstrates easily explained solutions and is immediately ready to engage. Agriculture accounts for 80% of water use globally. Agricultural irrigation and livestock watering account for 86.5% of water use in Colorado (Citizen's Guide to Colorado Water Education, Colorado Foundation for Water Education, 2004 edition, pg 4). Food production is the largest contributor to water pollution, adversely impacting our streams, rivers, and reservoirs through eutrophication. Laboratory-produced pesticides, herbicides and fertilizers, used across several growing seasons, result in concentration in our water and bio-magnification in human food. The food / water / energy nexus is a significant issue for Colorado and the world; the GGP's park and its mission are a clear microcosm of this nexus. Ninety eight percent of all leafy greens consumed in the United States are produced in the Salinas area of California or in the Yuma valley of Arizona. An enormous amount of water and carbon footprint is associated with the production, storage, and transportation of these greens to consumers in Colorado. GGP's project demonstrates that food doesn't have to be shipped long distances. We can produce food locally and year-round, even at 7,500 feet elevation. The project is replicable and does not require a near-by hot spring.
Describe how this project impacts current or emerging trends; technologies; clusters, sectors, or groups in water innovation.
Colorado economic sectors, that are positively impacted by the GGP project, include agriculture, energy, industry and tourism. Greenhouses are typically energy intensive operations with most of the energy use for heating and lighting. Most Colorado food greenhouses are seasonal, because heating with natural gas and lighting with electricity through the winter months is simply not cost effective for the grower. GGP's soil-based or aquaponics greenhouses are heated with geothermal water and lit with passive solar. GGP minimizes the consumptive use of irrigation or domestic water through careful monitoring, automatic and intentional watering. When all three year-round greenhouses are operational and a water-efficient outdoor seasonal garden is growing vegetables, GGP will measure water use through meters as the water enters each system. Then water use comparisons will be more valid and be used to document and demonstrate the value of our project. GGP's Innovation Dome will be able to produce approximately 48 heads of lettuce or 15 pounds of basil per day. Tilapia tanks can produce approximately 15 pounds of whole fish per day, or 630 pounds every 6 weeks. That's approximately 6 ten pound tubs of fish to be processed by a local entrepreneur. Vertical towers will produce vining vegetables such as tomatoes, squash and cucumbers. The exact cultivars to be grown in the Innovation Dome are yet to decided, of course. The point to be made here is its economic viability and, most importantly, its extreme water conservation. Consumer trends in local sustainably grown food are well documented, creating entrepreneurial opportunities for Colorado's innovative farmers. In the face of these market trends favoring water-conservative agriculture, GGP can demonstrate far greater efficiency and profitability using well-

Innovation Track
designed greenhouse systems. GGP looks forward to teaching the viability of water-conservative food production in hands-on workshops for all ages.

Last Updated: July 5, 2017

Colorado Water Conservation Board
Water Plan Grant - Exhibit A

Statement Of Work	
Date:	**July 20, 2017**
Name of Applicant:	**Geothermal Greenhouse Partnership, Inc**
Name of Water Project:	
Funding Source:	

Water Project Overview: Please provide a summary of the proposed water project (200 words or less). The same summary can be used from Page 5 of the CWP Grant Application.

The GGP Project when complete, includes three 42 foot agricultural growing domes heated by solar and geothermal energy, grounded in water-saving permaculture practices, centrally located in downtown Pagosa Springs on land and with water leased from the Town. Outside it includes ornamental and vegetable gardens and an amphitheater. The Education Dome is now hosting classes for children, Lifelong Learning Workshops, and producing a revenue stream for the organization. Programs and workshops, dealing in different ways with the challenges of Colorado water conservation in the 21st century, are in progress. The amphitheater is home to community events hosted by the organization and will soon produce a revenue stream. Our final phase, and the one for which we are seeking CWCB funding, will see the completion of the project with the construction of our Community and Innovation Domes. The Community Dome will provide community organizations with growing space to fulfill their specific goals while at the same time achieving our goal of growing food and community with local energy based on water conservation principles and practices. The Innovation Dome will be an aquaponic growing environment, demonstrating high yields of food and extreme water conservation. This dome will serve as an educational demonstration site and a sustaining revenue stream. The GGP park in Pagosa Springs will become a touchstone for learning about the intersection and future of water conservation, sustainable food production, and renewable energy.

Objectives: List the objectives of the project.

Construction

1. **Complete construction of Domes 2 & 3**

2. **Complete interior build-out of Domes 2 & 3**

Education GGP's educational mission can be realized with the completion of 3 greenhouse facilities. Engagement of learners of all ages will be significantly increased with the ability to demonstrate innovative water conservative food production.

Last Updated: July 5, 2017

Tasks
Provide a detailed description of each project task using the following format:
Task 1 – Complete construction of Domes 2 & 3.
Description of Task:
- Order 2 growing domes from manufacturer - Install two growing domes on the GGP site using existing engineered plans - Install water infrastructure (geothermal, Irrigation, and potable) already stubbed out at each site - Pour concrete foundation and stem wall
Method/Procedure:
- GGP's contractor coordinates the process of exterior construction - The plumber installs the underground and above ground pipes in each greenhouse - Concrete foundation and stem wall is poured by general contractor's concrete crew - The greenhouse manufacturer's construction crew completes the exterior polycarbonate shell
Grantee Deliverable: Describe the deliverable the grantee expects from this task
Completed exterior of the Community Garden Dome. Completed exterior of the Innovation Dome.
CWCB Deliverable: Describe the deliverable the grantee will provide CWCB documenting the completion of this task
Upon completion of this task, CWCB can point to 2 demonstration sites for water conservative agriculture and education. GGP will provide photographic documentation, telephone communications, and written reports to CWCB.

Last Updated: July 5, 2017

Tasks
Provide a detailed description of each task using the following format:
Task 2 – Complete interior build-out of domes 2 & 3
Description of Task:
Community Garden Dome: - Place raised water pond on the north side - Build wooden-sided beds to maximize growing surface area for conventional soil growing - Place soil into garden beds - Place gravel in walkways between beds - Install automatic drip watering and timer Innovation Dome - Build elevated platform and ladder - Install aquaponics growing system and closed loop system piping - Fish rearing tanks, sump pump, clarifying tank, filter tanks, degasser, concrete hydroponic deep water tanks on gravel ground floor - Pave stone pathways - NFT growing troughs on platform - Vertical towers in center
Method/Procedure:
Community Garden Dome: - Carpenters, framers are hired to build beds - Hired laborers and/or volunteers move soil with wheelbarrows - Hired laborers and/or volunteers spread gravel on floor - Landscaper installs automatic drip watering system and timer Innovation Dome - Two experienced aquaponics system installers lead team of laborers and work with project plumber - Equipment larger than the greenhouse door must be placed in dome before the exterior construction - Spread gravel under tanks, paving stones in walkways - Install NFT toughs on platform and vertical towers across radius of dome
Grantee Deliverable: Describe the deliverable the grantee expects from this task
GGP expects to cycle (test) the water system before bringing in fish, training growers and planting 1st crop. A functioning closed-loop aquaponics system is GGP's expectation.
CWCB Deliverable: Describe the deliverable the grantee will provide CWCB documenting the completion of this task
GGP will provide photographic documentation of completion for CWCB, written reports and eventual demonstration of operating system.

Last Updated: July 5, 2017

Budget and Schedule

This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues. The CWCB may withhold reimbursement until satisfactory progress reports have been submitted.

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

The CWCB will withhold disbursement the last 10% of the budget until the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Last Updated: July 5, 2017

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Exhibit A
Budget and Schedule

Date: revised for 9/5/17

Name of Applicant: Geothermal Greenhouse Partnership

Name of Water Project:

Task No.	Task Description	Start Date[(1)]	End Date	Grant Funding Request	Match Funding	Total
1	Complete exterior construction of domes 2 & 3 (to be ordered 1/15/18)	1-Apr-18	6/1/2018	88,000.00	34,000	$122,000
2	Complete interior build-out of domes 2 & 3	6/15/18	2/1/19	$86,500	$50,000	$136,500
						$0
	GGP bank balance 9/5/17 = $25,277.87					$0
	GGP unspent funds from previous (ongoing) CWCB grant = $20,000					$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
			Total	$174,500	$84,000	$258,500

(1) Start Date for funding under $100K, minimum 45 Days from Board Approval; Start Date for funding over $100K, minimum 90 Days from Bo

·Round values up to the nearest hundred dollars.

·Reimbursement eligibility commences upon the grantee's receipt of a Notice to Proceed (NTP)

·NTP will not be accepted as a start date. Project activities may commence as soon as grantee enters contract and receives formal NTP if

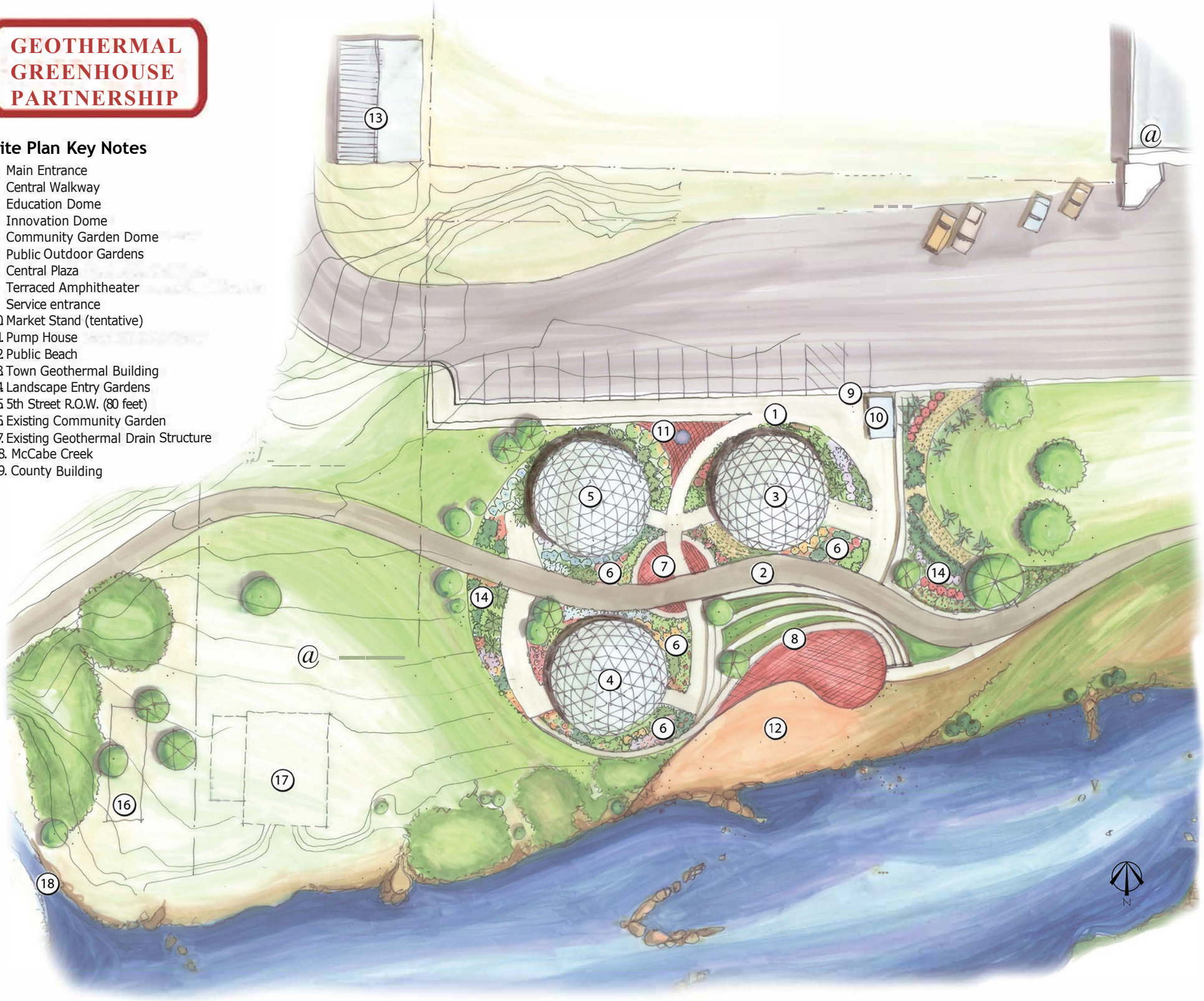
·The applicant shall provide a progress repost every 6 months, beginning from the date of contract execution.

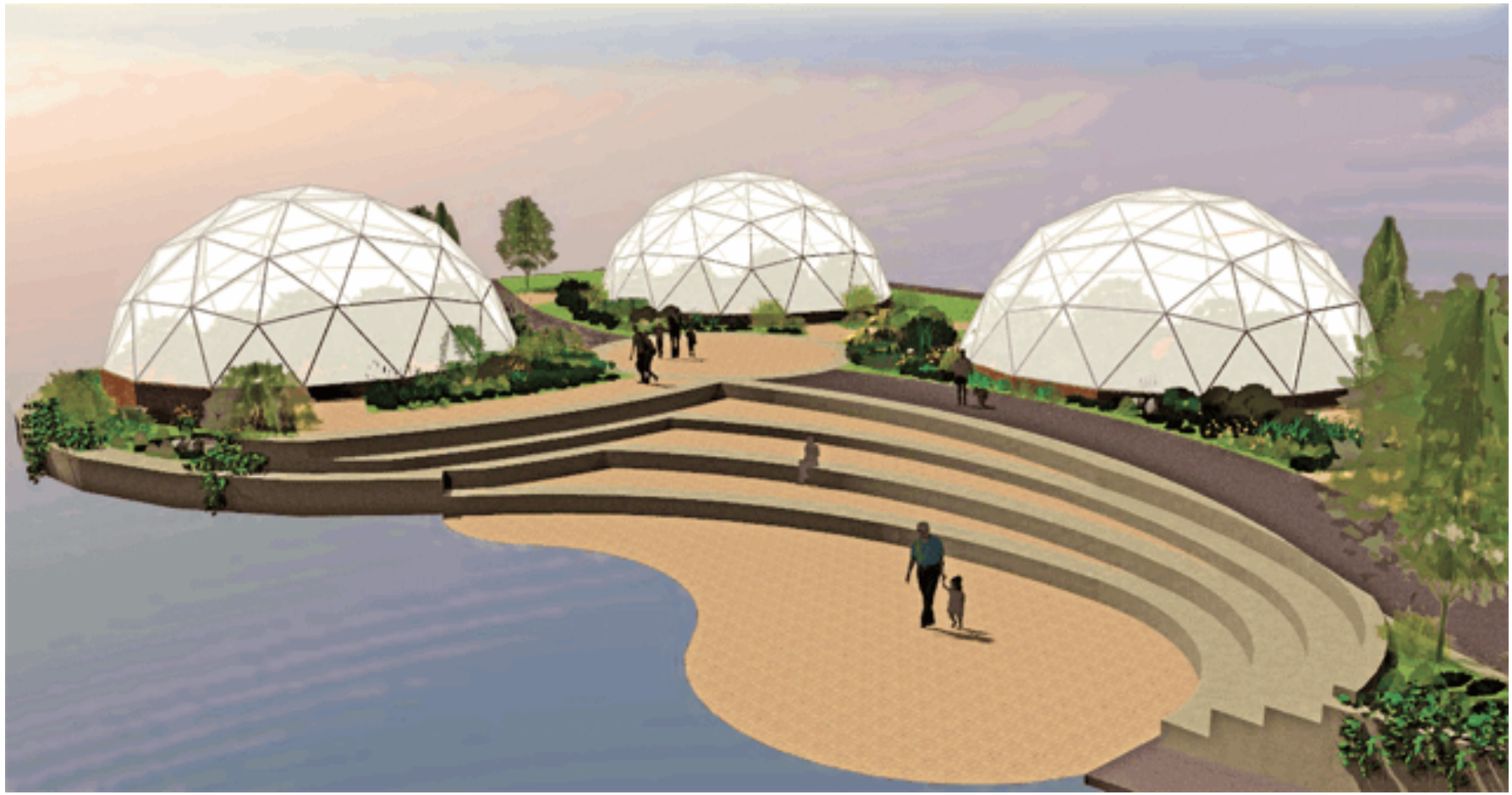
·CWCB will withhold disbursement of the last 10% of the total grant amount until a Final Report is completed to the satisfaction of CWCB

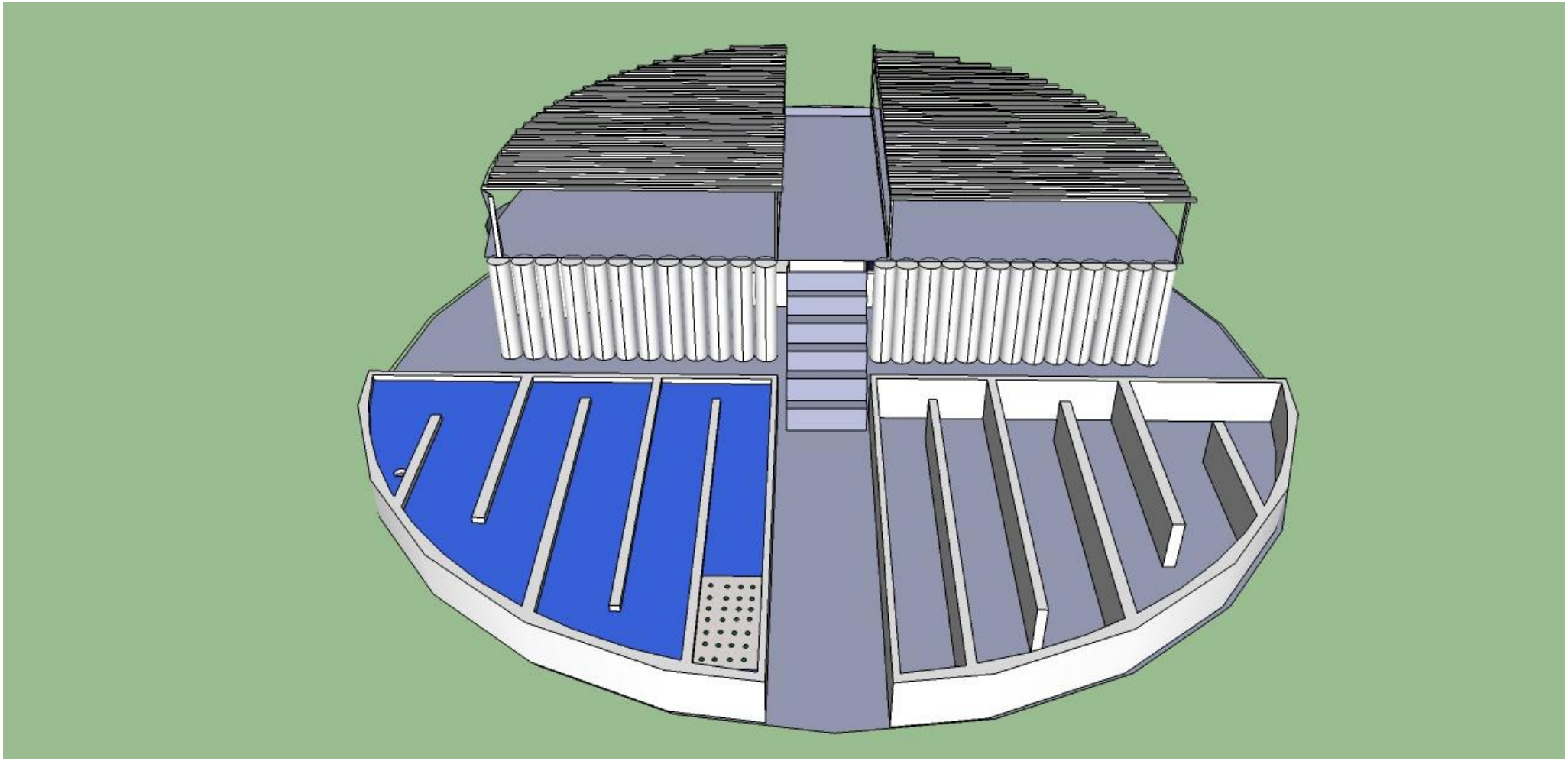
GEOTHERMAL GREENHOUSE PARTNERSHIP

Site Plan Key Notes

1. Main Entrance
2. Central Walkway
3. Education Dome
4. Innovation Dome
5. Community Garden Dome
6. Public Outdoor Gardens
7. Central Plaza
8. Terraced Amphitheater
9. Service entrance
10. Market Stand (tentative)
11. Pump House
12. Public Beach
13. Town Geothermal Building
14. Landscape Entry Gardens
15. 5th Street R.O.W. (80 feet)
16. Existing Community Garden
17. Existing Geothermal Drain Structure
18. McCabe Creek
19. County Building







OFFICE OF COUNTY COMMISSIONERS
P.O. Box 1507
Pagosa Springs, CO 81147

(970) 264-8300
FAX (970) 264-8306

August 7, 2017

Dear Colorado Water Conservation Board;

It is with great pleasure that the Archuleta Board of County Commissioners authors this letter. The Geothermal Greenhouse Partnership is a grassroots endeavor which we have supported from its inception and have contributed significantly to its progress with labor, equipment and funding and watch grow into its current state of offering educational opportunities in sustainable agriculture to both youth and adults in our County.

This totally volunteer organization also contributes to area vitality by having become a gathering place in Centennial Park, attracting local folk as well as tourists who come to purchase fresh vegetables, to seek information about growing in a greenhouse or to attend a GGP event in the amphitheater, whether it be a workshop on river health or a concert.

The existing Educational Dome is an outstanding success. One bit of evidence here is provided by the success of the 4H students who gardened in the Dome this winter, spring and summer. Four out of the five who exhibited at the Archuleta County Fair qualified for the Colorado State Fair with projects such as "First Year Gardening in a Greenhouse – What I have learned." These children will carry the GGP's message forward.

We look forward to the completion of the GGP project with the construction of the Community Gardening and Innovation Domes and support the GGP in its bid for grant funding from your organization. Our continued support is guaranteed. With the completion of the project, the GGP will be able to extend its influence and its message regarding wise use of water.

Sincerely,

Steve Wadley
Chairman

Supporting Our Schools To Greater Heights

ARCHULETA SCHOOL DISTRICT

July 21, 2017

Dear Colorado Water Conservation Board,

Archuleta School District 50-Jt endorses your agency's funding of the Geothermal Greenhouse Partnership without hesitation. Archuleta School District has supported the Geothermal Greenhouse Partnership since its incorporation in 2012. We are excited that the nonprofit has an opportunity to complete the construction of the park and to expand their educational experiences for all ages.

The San Juan River runs through the heart of Pagosa Springs. Water education is essential to our students' academic achievement. Providing a strong sense of place and recognizing the importance of water to Colorado is key to our shared future.

Since the GGP began operations in early 2017, several of our teachers have chosen to participate in growing food and other learning experiences in the Education Greenhouse. The GGP provided an orientation about geothermal energy in our 6th grade Renewable Energy Fair. Three of our teachers now serve on the GGP's Programming Committee, planning future educational opportunities for our students. Planning for 2018's curricular offerings is being planned now. Especially at Pagosa Springs Middle School, experiential and place based learning is woven into many areas of our curriculum and the Education Greenhouse provides an excellent venue for our students to learn in a real world environment.

Thank you for considering the GGP for funding to build two more greenhouses. Archuleta Schools hope this educational site, dedicated to environmental education and community service is completed in the coming year. Please feel free to contact me if you need any clarification about the strong partnership between the GGP and Archuleta School District. My number is below.

Kind regards,

Linda Reed

Linda Reed
Superintendent

Phone (970) 264 2228 Fax (970) 264 4631 | P.O. Box 1498, Pagosa Springs, CO 81147
www.mypagosaschools.com

COLORADO
Energy Office

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman St.
Denver, CO 80203

July 28, 2017

Dear grant committee:

The Colorado Energy Office (CEO) is pleased to offer this letter in support of the Geothermal Greenhouse Partnership's (GGP) grant application regarding geothermal greenhouses and the geothermal education park.

CEO's mission is to deliver cost-effective energy services and advance innovative energy solutions for the benefit of all Coloradans. For many years, Colorado has worked with geothermal stakeholders to assist in the development of geothermal projects that serve Coloradans.

The GGP is a multi-faceted nonprofit organization building a 21st Century botanic park in Pagosa Springs. The educational 501c3 operates the first of three Growing Dome greenhouses – the Education Dome - on the banks of the San Juan River. It is the first geothermal project to be partially funded by Colorado Water Conservation Board.

We are happy to support this endeavor and see the completion of the geothermal education park.

Sincerely,

Karen W Phelan

Karen Phelan, Deputy Director
Colorado Energy Office

On 1/20/2017 2:59 PM, Jim Fricke wrote:
Pauline,

Thanks for coming and presenting to the Board of Colorado Garden Foundation on Wednesday. The Board is very interested in your project and is offering your organization a $34,000 major grant that is contingent on your group raising the first $34,000 for the new greenhouse. Our funding will be awarded to you if those funds are raised by March 31, 2018. The funds would be awarded out of our 2018 grant cycle which means you would receive the funds in April or May of 2018. Please reply to this email that you are accepting our challenge grant.

Please let me know if you have any questions.

Jim Fricke
Executive Director
Colorado Garden Foundation
959 S. Kipling Pkwy, Suite 100
Lakewood, CO 80226
303-932-8100 x203
Fax 303-932-8101
A non-profit organization providing horticulture
scholarships and grants statewide

www.ColoradoGardenFoundation.org

SOUTHWEST BASINS ROUNDTABLE
Michael Preston, Chair
c/o Dolores Water Conservancy District
P.O. Box 1150
Cortez, Colorado 81321
970-565-7562

July 31, 2017

Colorado Water Conservation Board
c/o Mara MacKillop, Education and Innovation Activities Coordinator
Via: Email

Dear CWCB Board and Staff members,

I am writing to express my support, as Chair of the Southwest Basin Roundtable, for the Geothermal Greenhouse Project of Pagosa Springs request $186,000 from the Engagement and Innovation Grant Fund.

The Geothermal Greenhouse Project would complete the construction of the final two of three dome greenhouses that will support year-round food production focusing on water use efficiency. The domes are dedicated to educating children and adults on the principles and practices of water conservation. Produce from the domes will be taken home to their families by students.

The Southwest Basin Roundtable contributed Basin WSRF funds to the completion of the first dome. The Engagement and Innovation Grant Fund request will complete the domes and build on the momentum of the excellent teacher and student educational programs that have been established by the Geothermal Greenhouse Project.

Sincerely,

Michael Preston, Chair
Southwest Basin Roundtable

551 Hot Springs Boulevard
Post Office Box 1859
Pagosa Springs, CO 81147
Phone: 970.264.4151
Fax: 970.264.4634

August 1, 2017

Dear Colorado Water Conservation Board,

The Town of Pagosa Springs recommends the Geothermal Greenhouse Partnership, Inc. (GGP) for funding through the Colorado Water Plan's Engagement and Innovation grant opportunity. The funds will allow the GGP to complete the construction phase of their education and demonstration park.

The partnership between Pagosa Springs and the GGP (an educational 501(c)3) involves a lease of the site in Centennial Park as well as irrigation water and geothermal water. The Town believes the GGP is a good steward of the leased resources and administers them responsibly - always striving for fiscal and social accountability. By being able to build the proposed Community Garden and Innovation Domes, the GGP will greatly benefit our community and southwest Colorado.

The GGP conducts its educational activities under the guidance of its Programming Committee, a group of professional environmental educators who understand the Colorado Water Plan. The GGP Programming Committee is eager to plan water workshops and media events to advocate for the principles of wise water use and the future of Colorado's water. The GGP site in Pagosa's Centennial Park, on the banks of the San Juan River, already provides a touchstone for educational and cultural activities for all ages, both locals and visitors.

Please don't hesitate to contact me if you require more information or any clarification about the strong relationship between the Town of Pagosa Springs and the Geothermal Greenhouse Partnership. Thank you for your consideration of this wonderful opportunity for our community.

Best regards,

Don Volger, Mayor

ttSFCC
SANTA FE COMMUNITY COLLEGE

6401 Richards Avenue
Santa Fe, NM 87508-4887
(505) 428-1000
www.sfcc.edu

R. Charlie Shultz
Lead Faculty, Controlled Environment Agriculture
Santa Fe Community College
School of Trades, Technologies, Sustainability and Professional Studies
6401 Richards Ave
Santa Fe, NM 87508

To Whom it May Concern,

31 July 2017

This letter is being written in support of Geothermal Greenhouse Partnership's (GGP) proposal to fund an aquaponics innovation dome greenhouse in Pagosa Springs. If funded I would anticipate myself as well as my current and former students being involved in the design phase, build-out, and follow up training and consultation. I will donate my time and expertise (not to exceed $25,000) to see this project through from initial design to a fully functional food production greenhouse. If appropriate I will coordinate with GGP staff to coordinate a trip in the upcoming year with students enrolled in the Controlled Environment Agriculture (CEA) program here at Santa Fe Community College (SFCC) in New Mexico. I would anticipate my students' providing assistance during the build-out and installation phase and I can assist in training the future operators of the system. Again, My professional time and student time will be donated to the project.

I have been involved in Aquaponic Food production for more than 20 years. I currently serve as the Lead Faculty for the CEA program at Santa Fe Community College. Just a few years ago Eric Highfield of Fishit started the program here with the build out of a similar dome greenhouse as the one being planned for this project. Eric comes highly recommend for this project. He installed a balanced aquaponics system in the dome greenhouse here in Santa Fe a few years ago and it continues to operate continuously using very little energy or water resources. Eric and I have collaborated many times over the years on similar projects.

In anticipation of successful funding for this project I will work with Eric on the initial design phase. I will ensure the system is robust and efficient. My students will gain valuable experience helping to install the system and both them and I will be available for distance communication with GGP staff if any issues arise before, during and after the system is built. I would like to see a partnership between SFCC and GGP to ensure this project is a success and a model for similar project in other communities.

I want to thank you in advance for considering this project. Aquaponics represents a new paradigm in water-saving food production. Recycling both nutrients and water creates probably the most sustainable food production system that exists today. The opportunity for this example to teach others by seeing a functional system is what excites me. For sure, once up and running, this system will attract much attention!

Sincerely,

RCShultz

July 25, 2017

ECONOMIC DEVELOPMENT DISTRICT
OF SOUTHWEST COLORADO

Sally High
c/o Geothermal Greenhouse Partnership
PO Box 5333
Pagosa Springs, CO 81147

Re: Letter of support for **Geothermal Greenhouse Partnership**

SERVING THE COUNTIES OF:

ARCHULETA

DOLORES

LA PLATA

MONTEZUMA

SAN JUAN

SOUTHERN UTE
INDIAN TRIBE

UTE MOUNTAIN UTE
INDIAN TRIBE

To Whom It May Concern:

The Region 9 Economic Development District of SW Colorado respectfully submits this letter of support for the Geothermal Greenhouse Partnership. The initial Education Dome is fully operational and maintained by students and volunteers, creating an educational opportunity for southwest Colorado. This collaborative project would not be possible without the initial help of the Town of Pagosa Springs and the Colorado Water Conservation Board.

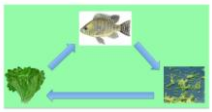
Region 9 believes building the Community Garden and the Innovation Dome will continue to benefit the geothermal greenhouse park within Pagosa Springs' Centennial Park and their community educational opportunities. Workshops on the Colorado Water Plan will help facilitate the importance of water conservation in Colorado and in our rural communities.

Region 9 supports the endeavor to create this educational and economic development draw for the community. If you need any additional information, feel free to contact me at 970-247-9621.

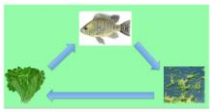
Sincerely,

Laura Marchino, CEcD
Director Region 9 EDD

ADMINISTRATIVE OFFICES:
295A Girard St.
Durango, CO 81303
(970) 247-9621 PHONE
(970) 247-9513 FAX
www.scan.org



Fishit Aquaponics LLC



7/31/17

Dear Colorado Water Conservation Board,

I, Eric Highfield, on behalf of Fishit Aquaponics LLC would like to offer my services for design, installation, operator training, and continued consulting to the Geothermal Greenhouse Partnership for the build out and initial operation of the nonprofit's Innovation Dome located in Pagosa Springs, CO. These donated services will not exceed $25,000.

Build out of the aquaponic system will include all above ground system plumbing, above and below ground air distribution lines, commissioning of the regenerative air blowers, ensuring proper water flow through the system, cycling the system biologically to ensure it is prepared for the introduction of fish, training of operators to run the system and consultation in the early stages of operations.

Regards,

Eric Highfield

CEO Fishit Aquaponics LLC
P.O. Box 1106
Pagosa Springs, CO 81147
720-628-7854