

# Pangea Institute Design Competition

August 1, 2005

## Philosophy and Design Goals:

Sustainability in the built environment includes not only alternate moves in the built environment but most importantly a shift in the understanding of how the built environment interfaces with and determines our social, cultural, economic, individual, family health. So the broad subjects of sustainability and health become synonymous in a broad understanding of moving towards a sustainable environment.

The key elements outlined in the Pangea Design Competition mission statement include such pivotal concepts such as integration of art, economic success in consort with the environment, living in natural beauty, individual freedom, health and education all tie together into a holistic, integrated approach to living. Those exact concepts form the basis of our design approach. Holistic Design, Integrated Design forms the cornerstones for 21<sup>st</sup> Century sustainable development. These concepts include the social ideal outlined above but also include process that include people as well as cutting edge technology and building systems.

Sustainability without the foundations of Holistic and Integrated Design will repeat the pitfalls of previous stylistic, design movements and fall away. Key to the success today in the future of sustainable design is the concepts of process, inclusion, egalitarian understanding of stake holder's concepts integrated into a complete, holistic design that looks beyond structures and landscapes. This proposal focuses on this fundamental concept...Holistic and Integrated Design.

Some basic concepts to our definition of greenbuilding design include:

1. Green building need not look like a machine. Cultural and archetypal, traditional forms allowed for sustainable development and building prior to the 20<sup>th</sup> century and can lend themselves to the modern concepts of sustainability. Our approach includes the archetype prevalent to the Colorado Front Range area, a western ranch style. This style however remains a stylistic flavor and not a strict interpretation.
2. Green building must be affordable. We project the construction costs of this project when considering Life Cycle Assessment (LCA) and William McDonough's "Cradle to Cradle" principles will actually be cheaper within a decade than traditional, typical construction costs.

## Architecture

Buildings, as one of the largest industries in the world, account for a major part of the total energy and materials consumption. More than 30% of America's total energy use, 60% of its electricity and financial resources, and 26% of the contents of its landfills are linked to buildings (*AFCEE, 2000*)<sup>1</sup>. A total of 54% of the energy used in the U.S. is attributed to the built environment. In addition, 80% of the average American's time is spent indoors. *Hence decreasing the material and energy use associated with buildings, while also using more benign, less-polluting building materials, can simultaneously improve the health of ecosystems as well as the human inhabitants of buildings.*

The Pangea Institute, a real project, slated for construction in the future, will provide environmental and sustainability education to youth and the community as well as a functioning community founded on the concepts of sustainability. These concepts must be understood in the broadest terms, including the social, cultural, community issues raised above. It also includes concepts that will manifest in a sustainable community. These build environment concepts include participatory process, community outreach,

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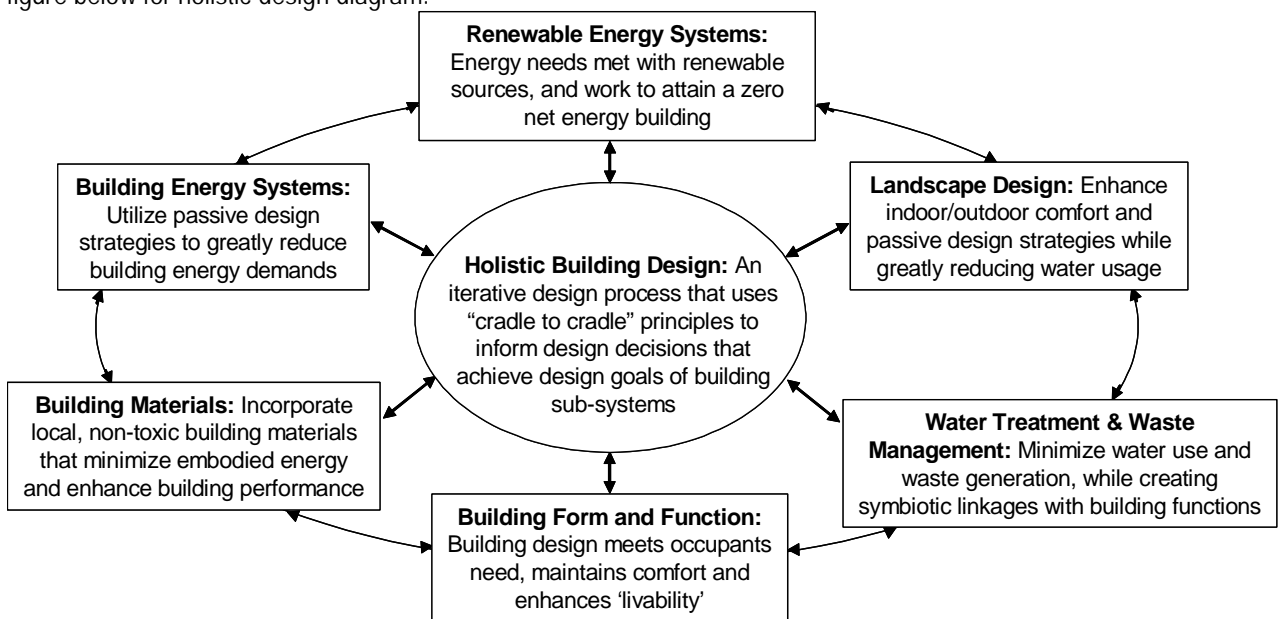
<sup>1</sup> AFCEE (Air Force Center for Environmental Excellence). 2000. Sustainable Facilities Guide. John Barrie Associates Architecture, Inc. & U.S. Air Force Combat Command.

education, healthy work environment, public/private space balance as well as architecture that responds to the environment with form and function, allowing a communication and balance with the natural environment.

**THE PROJECT OBJECTIVE:** focuses on a sustainable institute campus that develops and showcases research and design of holistic integration of building systems, building materials, energy, water, and waste sub-systems to achieve a zero net energy consuming project with maximal water conservation, minimal pollution and waste discharge (the goal is “zero”), and maximum recyclability, whose design phase requisites active public participation.

All buildings and infrastructure at the Pangea Institute will be constructed largely from greenbuilding materials and recycled/agricultural waste products as much as possible, and will be designed and engineered to minimize water use, minimize exposure to environmental pollutants, consume net zero energy over a year and produce zero waste, while being structurally safe and aesthetically pleasing. The success of the final design will be evaluated by the following metrics: costs, ecological footprint, demand of material, energy and water usage, occupant comfort, productivity, and well-being, indoor air quality and ambience, and the viability of cyclical systems.

Central to the goal of integrated holistic building design is a complete revamping of the conventional design objectives of a building. Traditional building design and construction focuses on minimizing initial costs, which often overlooks a multitude of hidden long-term savings that result from a full integration of sustainable systems. ‘Green’ building design is now beginning to replace the older traditional building design in the U.S. because it utilizes the innovation of a holistic approach, viewing the building as akin to a natural ecosystem composed of interconnected sub-systems. Fully integrating multiple sub-systems leads to a positive feedback cycle where waste sources become valuable inputs for other processes, material-, energy-, water-demand decreases dramatically; life cycle costs are reduced over the entire life of the building (not simply looking at a few year payback that neglects external costs on the environment); occupant comfort, productivity, and well-being can be significantly increased, which all leads to a cyclical system approach that models the zero-waste systems of natural ecosystems. Holistic building design is an iterative design process that uses “cradle to cradle” principles to inform design decisions that achieve the design goals of the building sub-systems. This is the design approach we used for the Pangea Institute, which is discussed further below with information on each of the sub-systems under Design Details, see figure below for holistic design diagram.



## Design Concepts

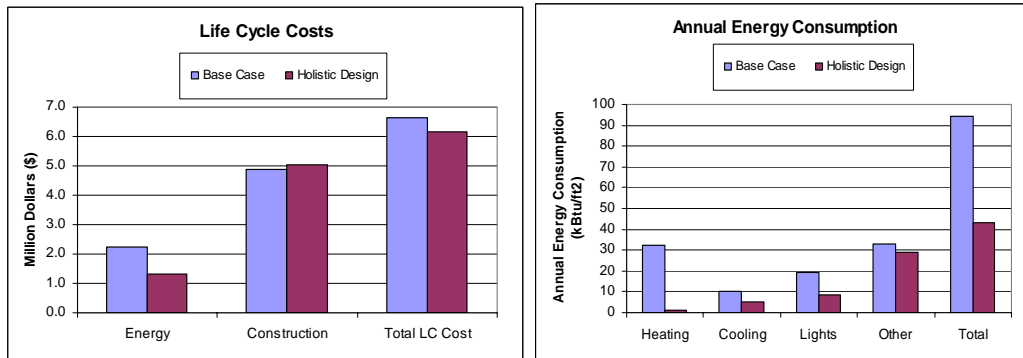
- **Programming:** While tenants always change throughout the life of a project, the theme, function and use of the building should remain consistent. Flexibility and phasing remain some of sustainable design's fundamental tenets. Architecturally this creates flexible spaces, a multi-use approach to interior programs with overlapping functions and users. Multiple functions in flexible spaces create opportunities to enhance the ideas of sustainable design and allows your designs to become efficient, compact, fully used and occupied and therefore an integral part of the argument: "green is cheaper"! This allows the downsizing and combining of programmatic requirements, reduces square footage, creates a consistent and efficient energy system/profile, creates synergy within a project and an affordable program with few unused spaces throughout the days of the week. This then becomes one of our fundamental tenets of successful green design: flexibility, multi-use, malleable spaces for efficient projects. These are some of the ideas we as green designers must develop! The ever-popular mixed-use mantra now becomes a more specific multiple-use principle.

By maximizing the amount of space that is used throughout the day we create greater efficiency and thus sustainability. The cornerstone of this principle is the combination of multiple use spaces. The learning center's auditorium of 9000 sq. ft. is combined with other functions and dividers to provide alternately, exhibit space, meeting space, performance space, seminar space, classroom space, while providing for opening dividers to allow the entire 9000 sq.ft. space to be utilized as one large auditorium. By fully utilizing space, the physical size and the ecological foot print are both dramatically reduced. This is one of the cornerstones for sustainable design, the efficient use of space.

- **Microclimate:** The climate is marked by a tremendous year round solar resource, cold dry winters, and warm dry summers. From this preliminary climate analysis we could prioritize the following passive design strategies:
  - Take advantage of solar gains in winter and limit direct solar gains in summer and swing season months
  - Utilize thermal mass to control indoor temperature fluctuations and to store some of the solar energy
  - Dry outdoor air provides a great opportunity for natural ventilation, with possible evaporative cooling to meet the cooling loads in the warm summer months
  - Provide sufficient insulation to thermally protect the building from the extreme weather conditions.
- **Landscape Design:** The landscape design priorities for this area are a balance of outdoor comfort, blocking winter winds, and providing access to summer winds augmented with evaporative cooling evapotranspiration to promote natural ventilation, as well as to enhance the outdoor educational exhibits.
- **Architecture:** Sustainable Design and Greenbuilding Design cover a broad area of concepts. This project will focus on a broad understanding and pallet of sustainability as discussed above. Our proposal in dealing with the built environment will focus on a number of specific goals and built environment concepts. Oh, by the way, of course we are striving for all eligible buildings and facilities in the Pangea Institute project to achieve LEED Platinum Certification. If accomplished, this would be the first such project in Colorado and the West to receive this recognition. LEED however is merely a subset to sustainable and green development; it forms a good checklist and not the foundations of sustainability. To that end, all systems and components will be weighed

through the LEED process but the principles will be founded in far reaching concepts of sustainability.

These charts show this project's projected LCC and Energy Consumption when compared to a typical Colorado project. It includes a 50% savings in energy and a Life Cycle Cost savings of \$½ m.



## Design Details

The project will support:

### Art

- Architectural expression and **integration of art** within the daily environment. It includes structures and outside spaces focusing on art making and exhibiting. This includes a town center anchored by the Learning and Performing Center, the Wellness Center with an outside performance and display town plaza. This community center will focus on the concepts of art within daily living.

## Economics and Ecology

- **Economic success of the community**, the Institute, the participants, the companies, all of which provide the basis for community economy. The project focuses on sustainable business practices, emerging technologies, entrepreneur opportunities in green industries and companies. The economic health will be anchored by two key components: the walkable retail/commercial center adjacent to the art plaza, allowing for an outside/inside approach to mixed use economic development. This will provide the critical mass necessary for sustainable economic development at the grass roots level. The second key component is the Pangea Soap company complex utilized as the economic anchor for the project.

## Energy

- To maximize energy conservation, **ALL** building designs incorporate a number of passive design strategies including: passive solar heating, daylighting, a highly insulated envelope, integrated shading devices to control southern, eastern and western sun, thermal mass (very important in passive solar designs to utilize the sun's energy throughout the day by 'storing' it in the building's thermal mass), passive solar cooling strategies with natural, thermal gradient and convective concepts, and natural ventilation that enhanced by the landscape design. Integration of the holistic design principles (maximizing passive design strategies) results in building designs that can achieve an estimated energy savings of 50 to 75 percent relative to a building that is built to local energy code or ASHRAE Standards<sup>1</sup>.

<sup>1</sup> The range of savings represents differences in building use (miscellaneous equipment loads).

- **Maximize Efficiency and Performance:** As we have mentioned, all the building sub-systems are closely interrelated in holistic building design to maximize efficiency and performance. Natural ventilation coupled with the landscape design is an excellent example. The incorporation of green spaces and green roofs in the layout of our community design provides numerous benefits besides plant and herb crop cultivation. Those benefits include: evapotranspiration and shading in the summer months to provide natural cooling; enhanced natural ventilation by channeling wind through areas of the buildings, while providing a natural filter to improve indoor air quality; solar exposure in the winter months; the potential for permaculture gardening around the living areas; and visual aesthetics for the building occupants fostering a sense of connection with nature and their surroundings.
- **Energy Strategies & Systems:** Our building designs maximize passive strategies allowing us to eliminate certain active systems that have become common place in traditional building design in the U.S. For example, the natural ventilation schemes with simple pre-conditioning techniques like utilizing solar energy to preheat incoming air or evaporative cooling can feasibly meet all outdoor ventilation requirements thus eliminating the need for a traditional forced-air HVAC system. In addition, most thermal loads will be met by the natural ventilation leaving minimal heating loads that will be taken care of with radiant floor heating, whose energy will be derived from solar thermal collectors or a highly efficient ground-source heat pump, or possibly the waste heat from the biodiesel powered generator (see below). A schematic example of a natural ventilation scheme with evaporative cooling is shown in Figure 1.

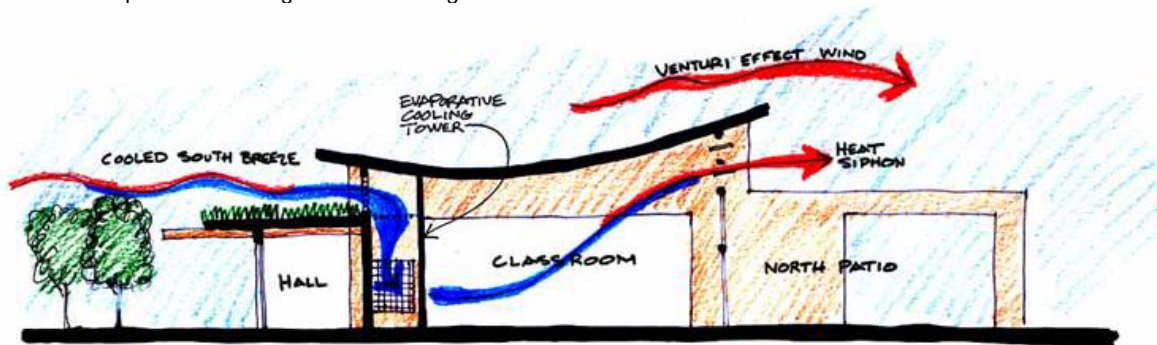


Figure 1 Design schematic showing natural ventilation with evaporative cooling.

- **Renewable Energy Systems (Zero-Net Energy):** One goal of the Pangea Institute is to achieve a zero-net energy community. This will be a challenge, but through diligent holistic design it can be achieved. First and foremost, the community and the buildings must be designed to maximize passive strategies and energy efficiency. To meet the remaining energy requirements of a highly efficient building design, we are proposing the use of a number of technologies and energy sources. For the electrical needs we are proposing the use of: 1) photovoltaics (PV) and Building Integrated Photovoltaics (BIPV) that integrate PV's into the architectural design;<sup>1</sup> 2) a micro hydro generator in the stream; 3) small wind power generation; and 4) possibly a biodiesel driven generator for the electrical loads.<sup>2</sup> For the remaining heating loads (those after passive solar heating) we are proposing that we utilize: 1) the methane produced from the wastewater treatment

<sup>1</sup> With the passage of Measure 37, financial incentives for PV should be available from Xcel in the next year.

<sup>2</sup> The wind resource in the Boulder area is considered poor (gusty, without a sustained wind), therefore a small wind turbine may not be the most cost effective. Further analysis on each of the renewable energy systems will be necessary to determine actual cost performance.

digesters; 2) active solar water heating collectors; and 3) possibly the waste heat from the biodiesel generator. For the electrical power that will occasionally be drawn from the grid, we propose that the facility purchase green tags of renewably generated electricity. If the Pangea Institute will be using Xcel Energy as the utility, you may consider buying into the Windsource program to achieve this or actively seek out other green tag providers.

- Biodiesel: The use of biodiesel at the Pangea Institute is another example of how holistic design coincides with the principles of the cradle to cradle approach; by using locally based resources while looking for ways to utilize all 'waste streams' so that they become feedstocks for other processes. Biodiesel is a renewable energy source that can be produced locally (on-site) and whose utilization at the Pangea Institute could provide numerous benefits including: offsetting petroleum based fuel for any transportation needs; energy production on-site in the form of electricity or heat; and a potential feedstock for soap manufacturing. Biodiesel could easily be produced from vegetable oil sources on-site or locally (waste cooking oil from the restaurants, vegetable oil from local agriculture). Imagine a community where the used cooking oil is refined to become an energy resource for the community, while this refining process creates a potential feedstock for the soap manufacturing. A beautiful example of the 'cradle to cradle' approach, creating a cyclical system that mimics nature.

## Nature

- Sustainability supports and enhances the ideas of **living within natural beauty**. The built environment then becomes integrated within the natural environment. This is accomplished by sensitive site, landscape, architectural design that focuses sustainable concepts on the specifics of the people and the site. It meshes the requirements of the program with the requirements of the natural site. It includes:
  - Low rise/low profile structures that fit within the vernacular language of the ranching heritage of Colorado.
  - It features 1 and 2 story buildings, rancher's porches for traditional uses of protection from rain and sun but also for cultural, social opportunities of community.
  - It includes neighborhoods of low density, cluster housing opportunities, small block wide parks, paths, bikeways, promenades as well as alternate blocks of park and community gardens with every house facing a park or garden throughout the entire project
  - These basic architectural concepts will allow for the project to interact with the site and not dominate the site. Vistas will combine with natural site beauty to form a greenbuilt natural environment.
- Landscape Design: The landscape design plays a critical role in the overall performance of buildings and a sustainable community. The final landscape design will utilize a variety of native plants that require very little additional water to enhance indoor and outdoor comfort. We are expecting an 80 percent reduction in watering needs compared to a traditional landscape design, and a 100 percent reduction in potable water used for the landscape because we plan to use grey-water reclamation after treatment to provide any additional watering that is necessary.
- Our landscape design combines the principles of town planning, community planning and synergy to create a cohesive community and town center that creates a critical mass and sense of place. The focus of the center of the town, includes education, art and performance all supported by economic development and pedestrian approach. This includes shops, restaurant, café, parks, green space, arts and performance center, farmer's market and outside marketplace all surrounding a town plaza or square. The landscape designs go beyond xeriscaping to a holistic use of proper plantings and edible landscapes, landscape canopies, parks, gardens, paths,

walkways, as well as water resource recycling and diversion to create a stable, useful environment that cools in the summer and stores heat in the winter.

- Water collection and micro hydro use of owned surface water would be accomplished by purchasing primary water rights from the local municipal authority, allowing for collection, diversion and storage of a specified number of water rights. This concept will allow for full site water manipulation in micro-hydro applications as well as site/rain water collection and use.
- Our landscape design in general, provides an excellent example of how each sub-system is critically interlinked with other sub-systems. For example: the wastewater system provides re-used water for landscape irrigation; the now vibrant landscape enhances natural ventilation, provides shading and reduces winter infiltration; these 'services' lead to a reduction in each buildings' net energy use and costs.
- Our concept focuses on the ideals of permaculture. The 6 half-acre gardens in the neighborhoods and the 1 large 3-acre garden in the central plaza area should all be planned for permaculture approaches including water recycling, composting, vertical planting, symbiotic flora and fauna. This approach will showcase alternative agriculture and edible landscapes as an educational tool with programs connected to the Learning Center.
- Material Utilization: Building materials will be selected that reduce life cycle environmental impacts, have a lower life cycle cost and that don't degrade the indoor environmental quality for the occupants. The key is to use local, environmentally preferred building materials that are non-toxic for building occupants and the surrounding environment. Where concrete is used, we propose using high volume fly-ash concrete. The fly ash is a by product of coal-fired power plants (very prevalent in Colorado) that is used to offset Portland Cement, an extremely energy intensive cement. Other building materials may include locally grown strawbale, and rapidly renewable bamboo hardwood flooring.
- Green building materials and systems are now quantified in the LEED system and available in 5 major categories in Greenbuilding/LEED including: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources and Indoor Environmental Quality. The Boulder area is one of the nation's leaders in researching, supplying and providing greenbuilding materials. Many local organizations and universities are currently compiling and creating resource guides, providing an understandable source for green building materials and systems. These resource guides will provide the design team an easily available source for the complete design of greenbuilt materials and resources.

All greenbuilding materials will be weighed against the following criteria:

- Cost
- Maintenance
- Properties
- Life cycle
- Embodied energy
- Recycling
- Health
- Benefits & disadvantages

The greenbuilding materials and resources goal for this project would provide for doubling the Credit Standards for LEED points in the MR Categories of greenbuilding materials include the following CSI divisions:

02000 Green Roofs  
03000 Concrete/Fly ash  
04000 Agriboard  
05000 Structural Steel  
06000 Plastics  
06000 Wood  
08000 Windows  
09000 Bamboo Flooring  
09000 Flooring  
09000 Interior Paint  
12000 Furniture  
Natural Building-Straw Bale  
Natural Building-Earth Bag

The target LEED goals for green materials and resources for this project include:

Resource Reuse @ 20%  
Recycled Content @ 20%  
Regional Materials Manufactured Locally @ 40%  
Regional Materials Extracted Locally @ (100% of the above mfg. materials)  
Rapidly Renewable Materials @ 10%  
Certified Wood @ 100%

## Freedom, Privacy

- **Individual freedoms and private spaces** are enhanced by a combination of landscape architectural and building architectural designs. Courtyards, alcoves, private patios, semi-private front porches, private landscaped streets and small scale vehicular accessed alleyways build on individual privacy. Public promenades, small scale commercial pedestrian zones, outside dining, outside arts and performance spaces, the central plaza and exhibits for water treatment and permacultural agricultural zones enhance the concepts of community.

## Health

- **Public and private health** are both enhanced by the ecological layout of the site, the buildings, and the indoor and outdoor environments. This project focuses on the encouragement of walking and biking within the community through cooling positive tree lined spaces and wetlands. All access to all housing units is through tree lined pedestrian parks. Walking and riding is encouraged through the checkerboard of parks and green spaces. All cars are restricted to the North/South collector streets every other block, keeping the entire project pedestrian friendly. With this ambience, walking and biking will be a pleasurable, healthful experience while promoting the spirit of community. The entire site is full of existing natural streams and environments, meditative spaces, gardens, meandering pathways through parks, gardens and green front yard entries. Additionally the integration of wellness within the entire project's green materials and the focus on holistic design of Indoor/Outdoor Environmental Air Quality will greatly enhance the entire project's experience.
- These site amenities are of course augmented by a complete Wellness Center that includes the Yoga Center, a Healing Center and a Day Care Center, set directly in the center of the town's plaza.

## Education

- **Education** is integrated within the basic concepts of this project. Not only is education provided in the Learning Center, but throughout the entire project. The use of sustainable concepts will showcase alternative approaches to community development and the built environment of the 21<sup>st</sup> Century. Educating the public, the participants, the residence, the employees, the visitors, and the surrounding community will be accomplished by example and education. Education is one of the

most important aspects of sustainability and this project focuses on the education of sustainable form and function to a wide array of constituents.

## Water

- **Water consumption** is greatly reduced in our design both in the buildings as well the landscape. Building water use is reduced by incorporating waterless and low-flow toilets, waterless urinals, and water efficient fixtures. For the landscape we are expecting an 80 percent reduction in watering needs compared to a traditional landscape design, and a 100 percent reduction in potable water used for the landscape because we plan to use grey-water reclamation after treatment to provide any additional watering that is necessary. Overall, our water conservation measures result in a reduction of indoor potable water needs of 37 percent.
- The preliminary design of the on-site wastewater treatment uses source separation into greywater/blackwater and incorporation of a combination of anaerobic and aerobic digesters along with final solar purification and constructed wetlands to achieve reliable and pathogen-free effluent. In addition to the treatment of wastewater, energy will be produced in the form of methane by the digesters that can be utilized on-site for heating and/or cooking. The amount of energy produced will not be tremendous, but it will be a net energy producer unlike other waste treatment techniques like the Living Machine, which requires a substantial amount of energy (for the aerators). A schematic of our wastewater treatment, combining source separation and greywater utilization for irrigation is shown in Figure 2.

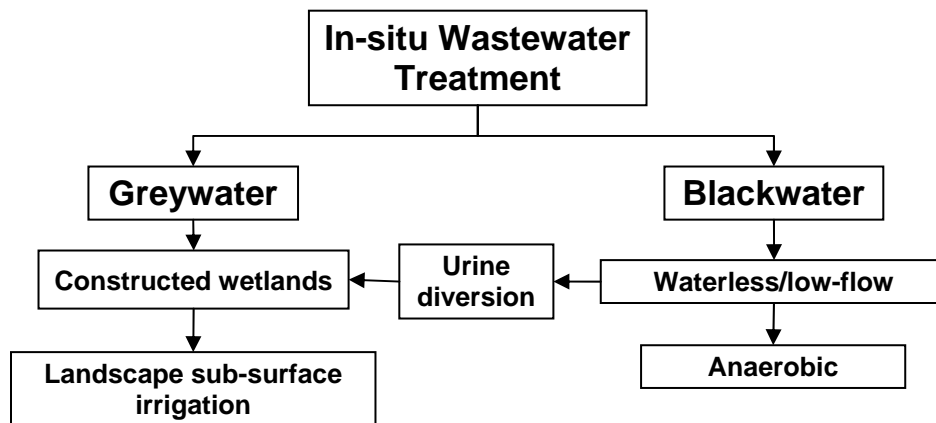


Figure 2 Schematic of wastewater treatment design

## Transportation

- Public transportation of Boulder will be contacted to potentially provide bus service to the site. No train service is planned for the area currently. Alternatives will be to encourage car pooling and alternate fuels for cars and vans for group access to the site. Biodiesel refined on-site could be used as an alternative fuel. Once at the Pangea Institute, walking and biking will be the primary means of movement around the site. Of course all areas of the site and project including the walking paths will be fully compliant with the Americans with Disabilities Act. The paths mentioned above will interconnect all residences and businesses via a unique pattern of front yard pedestrian, tree lined parkways with paths and gardens. This concept will carry over into the retail/commercial zone with walkable tree lined sidewalks and plazas. Car parks are planned on the perimeter with walking paths connecting all areas of the site via East/West paths. These on alternate blocks pass through full block sized gardens so that every block faces out onto a park or garden. North/South collector roads are located every other block for minimal vehicular access and emergency vehicles.

## Style

- Care has been taken to balance the need for higher density living in a sustainable community while providing unique and private residences that foster a sense of enrichment and connection with the community and the surrounding natural environment.
- A key element of this architectural/design style focuses on high design while supporting the best in cutting edge technology and systems for greenbuilding and sustainable design. The vernacular forms established in Colorado over the past century easily lend themselves to the concepts of climatic/green/sustainable design. With our snowy winters, hot summers, bright sun, dry climate, the architecture of Colorado has by necessity adapted to the microclimatic influences while developing its own unique Colorado Ranch Style. That style is the design direction for this project.
- While these forms remain dominant in their reactions to the site, climate, sun, culture, they also leave room for modern interpretations. So while the factory is actually a large 50,000 sq. ft. barn on two floors, it has a modern interpretation that reflects the ideal of a large factory structure while developing modern language that expresses reactions to natural northern daylight, warm southern sun, low angled and intense east and west light, a natural site, green roofs, an axis to the main promenade entry and so on.
- The Colorado Ranch Style includes the idea of low rise 1 and 2 story structures that relate more to the landscape and not to high urban style density. This project emphasizes the horizontal nature, orientation, views of the site. Likewise the shifted grid gives organization along a town plan genera yet allows for flexibility within each block for alternate housing arrangements.

## Growth/Phasing

- Phase I follows the Competition program as outlined below. The Phase II plan will be easily accommodated given the efficient site plan, creating a critical mass in the town center and allowing flexibility of occupied blocks alternating with parks and gardens every other block.

## Space Planning

Space Initial Area	Initial Area	Expanded Area	Initial #	Expanded #
<b>1. Learning Center</b>	<b>30,000</b>	<b>30,000</b>		
Art and Performance Center/Auditorium	1,000	1,000		
School	25	250		
<b>2. Wellness Center</b>	<b>10,000</b>	<b>10,000</b>		
Healing Center	5	50		
Yoga Studio	40	40		
Day Care Center	5	30		
<b>3. Open Air Market</b>	<b>5,000</b>	<b>5,000</b>	<b>1</b>	<b>1</b>
<b>4. Retail/Offices/Shops/Café/Restaurant</b>	<b>4,000</b>	<b>12,000</b>	<b>4</b>	<b>12</b>
	<b>4,000</b>	<b>4,000</b>		

<b>Housing</b>			<b>25</b>	<b>240</b>
<b>Studio</b>	<b>700</b>			
<b>1 Br</b>	<b>900</b>			
<b>2 Br</b>	<b>1,100</b>			
<b>3 Br</b>	<b>1,400</b>			
<b>4 Br</b>	<b>1,800</b>			
<b>Duplex</b>	<b>4,000</b>			
<b>Multi/Mixed use/     Work/Live</b>	<b>2,000</b>		<b>15</b>	<b>16</b>
<b>Market Place Plaza</b>	<b>8,000</b>	<b>8,000</b>		
<b>Edge Parking</b>	<b>18,000</b>	<b>40,000</b>	<b>60</b>	<b>130</b>
<b>Living Machine Greenhouse</b>	<b>3,500</b>	<b>5,000</b>		
<b>Factory</b>	<b>50,000</b>	<b>50,000</b>		
<b>Parks/Gardens</b>	<b>60,000</b>	<b>150,000</b>	<b>6</b>	<b>1</b>

## Conclusion

The Pangea Institute has the potential to become a national and/or international showcase for integrated sustainable community design, educating builders, urban planners and citizens worldwide to make design decisions that reduce their ecological footprint and that 'cultivate the(ir) understanding of sustainable living systems.' We feel that the integrated holistic design that has been described here is closely aligned with the goal of 'promoting individual and community empowerment, while living in harmony with earth.' Working to emulate the cyclic processes in nature we can create communities that lead fulfilling lives, enjoy economic prosperity, and that eliminate any negative long-term impacts to future generations on the planet.