This presentation premiered at WaterSmart Innovations

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INNOVATIONS

Integrated Water Management Eco Village Development

Eco Intelligence Group

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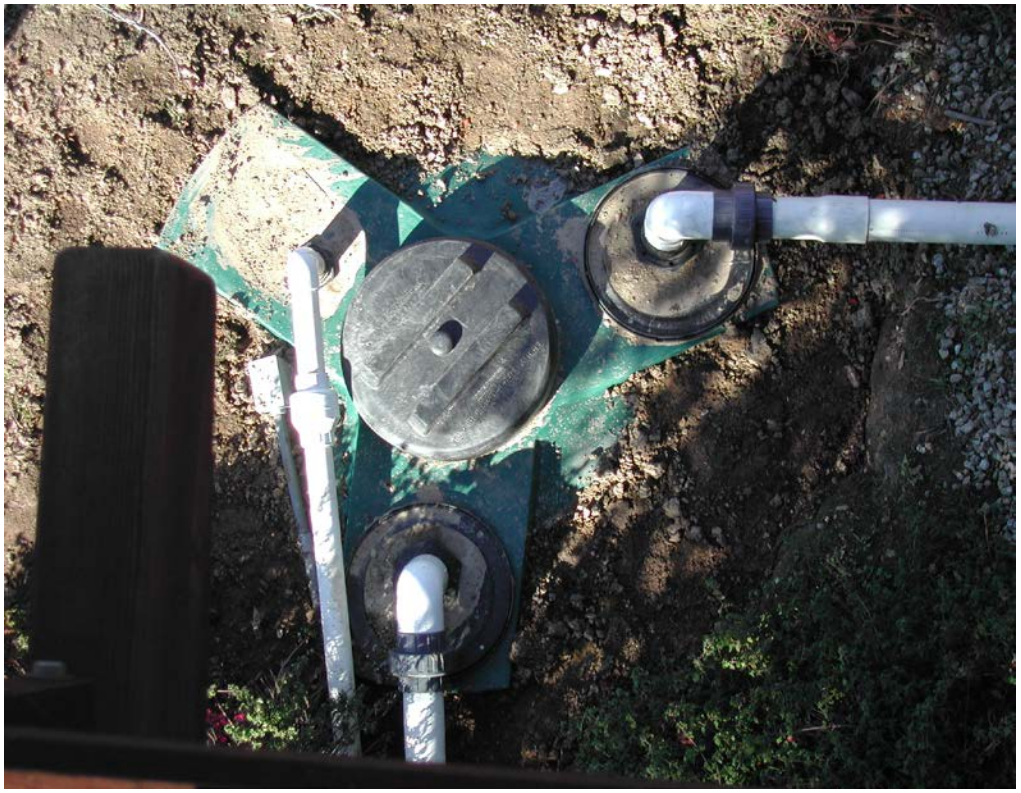
DEFINE BLUE DEVELOPMENT PROCESS

"BLUE DEVELOPMENT" IS WATER CENTRIC DEVELOPMENT

- Choose **Land**. Inventory **resources**
- Project programming **vision** & concept design
- **Identify user** demographic
- **Quantify** water demand
- Preliminary due diligence packet **talking papers** to communicate about, explain, & promote project
- Assemble & manage the highest quality collaborative **design team** for the project, communication with the spirit of cooperation & transparency,
- Prepare facility systems **operations manual** & pre-commissioning documents,
- Pursue entitlements & **permits**, construction drawings,
- Assemble **finance** team, hard due diligence, capital investment req, secure financing, long term payback

INTEGRATED WATER MANAGEMENT



WHAT CAN BE DONE

- **Living building protocol**, closed loop, net zero, scale development to the capacity of the land & precipitation
- **Watershed & aquifer stewardship**: only let clean remediated water flow to the watershed, use all other water sources except aquifer if possible
- **Calculate demand volumes** for domestic, agriculture & landscaping, commercial venues, industrial, client/ owner /occupant needs
- **Inventory resources**: municipal options, water shed, precipitation, reclamation & re-use
- **Remediation:** reclaim, filter, & reuse grey, black, storm, etc
- **Conservation**, innovation, efficient fixtures, appliance, & equipment
- **Habitat** creation/enhancement/remediation
- **Distribution**, collection, purification supply
- **Separation of systems** via colored pipe identification protocols & air gaps
- **Apply appropriate filtration to different sources**: roof catchment, gray, black, site run off, riparian, storm run off from pavement
- **Abundance management**: Retention, recharge, overflow
- **Roof & catchment** surface material concerns- obviously the least chemicals possible, potable use: prefer factory baked enamel metal or glass surface, domestic & food irrigation: if limited to galvanized metal or petroleum surfaces- use an ambitious filter & mycology, non potable uses lawns/commercial/industrial, then filter as per consultant recommends

PROJECT PROGRAMMING

WHY GRID OPTIONAL?

- **Net zero, Living Building**: Give the aquifer opportunity to recharge from overuse.
- **Wise use & respect** of precious resources that promotes community building
- **Security:** Emergency preparedness for water, waste treatment, food & medicinal plant production, literal life insurance & health assurance, local resistance. Academic & political communities have forecasted increasing: supply shortages, aquifer over use, desertification, increased global population, increased pollution quality by chemicals, nukes, arsenic & salt, aging Nat'l h20 infrastructure, by 2020 85% of USA dams will be aging & in need of improvements
- **Costs:** avoid yearly (compounded) water rate increases of utility companies. Relative good ROI for current economic times. Determine Initial capital investment for off grid vs.. emergency supply vs.. grid metered service infrastructure. Eco villages are an **investment** in a diversified portfolio of your own water/power/food/waste alchemy/healthcare/eldercare/transportation & community infrastructure to hedge against ever increasing costs & insecure quality & quantity of conventional mainstream grid services

Project Programming & Conceptual Design Vision

- master concept site design of **flow**, with integrated blue features, **translate** a large umbrella of demographic occupant / investor program ideas into integrated creative, holistic **bio-solution**, 1:100 scale sketches over survey maps
- Identify user demands, **Inventory resources** of land
- **Balance the water budget (availability vs. needs)** via conservation & innovation, above & below ground, site disturbance, durability , design the buildings around the roofs needed for catchment , Align buildings , roads, utility trenches , underground features, grading, excavation foundation structures , on site, to share simultaneous earthwork.
- identify the green building **matrix & code requirements**, visit jurisdiction depts. re: what is approvable,
- Receive **client / development team approval** to proceed & enlist design team

BLUE DUE DILIGENCE

PRE DEVELOPMENT WATER DUE DILIGENCE

- Look at the **politics** of local jurisdiction, master plan, neighbors, litigation, sources of water, allocation
- **Location** suitability selection: eco realtor network, find the appropriate location property
- **Resource** assessment : wood, water, wind, rock, botanicals, solar access, complimentary local collaborators
- **Verify rainfall** & historical frequency of drought for feasibility of off grid systems
- Satisfy **Fire Marshal** requirement for dependable water source
- Talk to local **well driller** regarding depth & lab test water quality
- **Ability to import** emergency potable water
- **Desalinization** fueled by renewable energy
- Ability to **import waste water**, to be reclaimed on site, water can be used and purified and then used again - and the cycle repeats
- **Contamination** for nearby nuclear leaks? Near fracking sites?
- **Plan for redundancy** back up supply sources, extreme conservation & reuse, see Living Building closed loop protocol and earthship biotecture strategies for using water multiple times
- **Scale the project** to fit the available water

BLUE DEVELOPMENT PROJECT EXAMPLE

EXAMPLE HYPOTHETICAL URBAN HYBRID

- We have each pursued development project due diligence, independently & together, over the last few years.
- We are piecing together the best aspects of successful projects in order to illustrate how to pursue a blue development

EXAMPLE PROPERTY PURCHASE

- **Transitional** organic orchard, & farm, in financial distress, heirs want to sell
- **100 Acres of Real Property:** agricultural farmland currently in cultivation, wetlands wooded area
- **3 building clusters** existing
- **Current Zoning**-County agricultural & mixed use, on the perimeter of a cosmopolitan small city. Land can be annexed into the City.
- **Topography**- Land is gently sloping
- **Water Rights:** 2 wells, spring, seasonal creek, wetlands pond

EXAMPLE DEVELOPMENT MISSION, VISION & OBJECTIVES

- 24 residential units, intentional green lifestyle
- Run agricultural as a CSA
- Establish Semi Urban Permaculture Institute
- Establish net-positive utility operations
- Complete infrastructure for off-the-grid "safety zone" community

EXISTING ROOF CATCHMENT AREA =10,000 SQ FT

- Site 1 is: Residential includes main house, detached farm hand lodging bunk house, carports & residential garage, storage buildings (**4000** sq ft roof catchment surface)
- Site 2 is agricultural barn, green house, & utility workshop barn (**5000** sq ft roof catchment surface)
- Site 3 is a roadside produce stand with coolers & storage (**1000** sq ft roof catchment surface)

EXAMPLE RAIN WATER ASSESSMENT

- Given: 18 inches rain fall x **10,000 sq ft** existing roof
- Vertical feet of rainfall x sq ft area of catchment surface x = cubic ft x 7.48 gal/cu ft = gal
- **Existing Available catchment** volume = 1.5 x 10,000 x 7.48 = **112,200 gal**

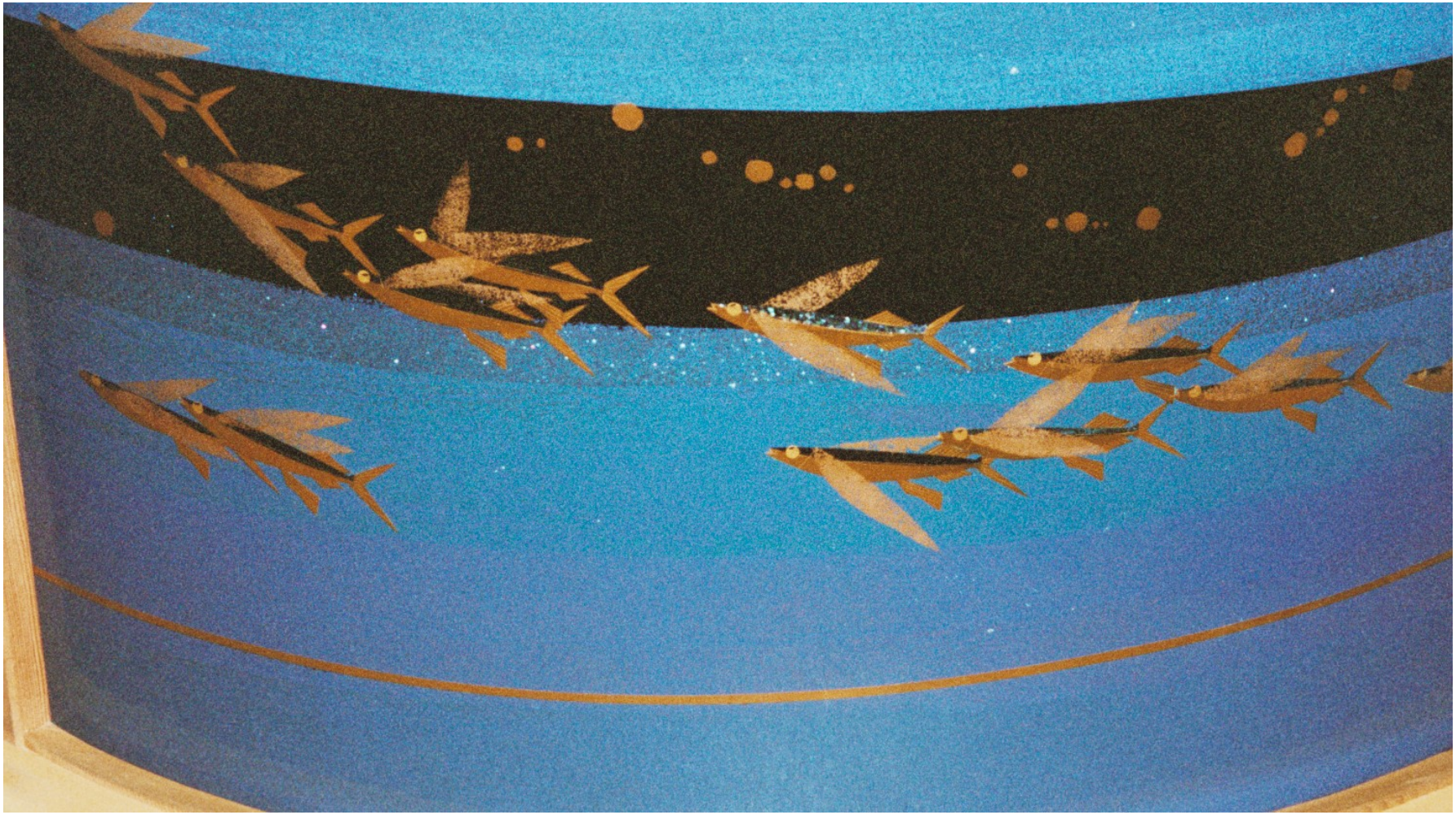
EXAMPLE NEW IMPROVEMENTS FOR 24 HOMES

- **Existing 10,000 sq ft roof catchment** is only 1/3 of domestic demand.
- **New 20,000 sq ft new roof area** community center commons, spa water healing temple, 20 more new residences, in pods of 4
- Total proposed additional catchment volume = 1.5 ft x **30,000 sq ft** x 7.48 gal/cu ft = **336,600 gal**
- Assume average of 2.5 occupants per residence x 24 units = 60 residents x 20 gal per day interior potable domestic h2o **demand** x 365 days/ yr **= 438,000 gal/**yr.
- **Interpretation**: add **another 11,000 sq ft roof** (green house for seedlings) catchment to meet 100% demand in catchment

EXAMPLE INTEGRATED SOLUTION OPPORTUNITIES

- Build **additional 11,000 sq ft green house** roof area for catchment, then the floor of the greenhouse could be a membrane with closed loop, the water could be recycled for multiple cycle irrigation, air to water / condensate / humidity collection could harvest usable distilled quality water from the evaporative cycle of the green house plants,
- **Annex to City** & get water meters for emergency supply fire dept connection
- Only use the **well as an emergency** use
- Use the spring, well, winter creek pond & gray water (50% of potable use = 228, 125 gals), **subterranean irrigation** (saves 50% in avoided evaporation).
- **Aquaponics** can further be used to filter the gray & storm water, raise fish
- Install **rain garden pre-filters** (see link) for all road storm water to remove vehicle & road chemicals. Create a borrows-pit / settling pond of the storm water, use this for irrigation, & as a retention /settling / percolation pond to resist overflow into the watershed.
- **Living Building Challenge**: Retain & reuse every drop of water on the site.

BLUE PROJECT FINANCE



BLUE PROJECT FUNDING

- Private Equity
- Debt/loans
- Fed, State, Local, & Utility Companies
- Public Private Partnerships (PPP)
- Start ups & Venture Capital
- Private Philanthropists
- Corporate Sustainability (CSR)
- Grants, Gifts, Foundations
- Rebates
- Incentives
- Loans

FINANCE SEQUENCE

- Preliminary **"Due Diligence Packets"** are essential talking papers to pursue financing & next steps and include - preliminary architecture, zoning review, determine maximum improvements allowed on a particular property, description of project, chronological steps, demographic market, strategic alliances & community participation, define phases, define build out, cost to build, appraised value of comparable properties, exit strategy, outcomes, operation costs once occupied, return on investment, timing, benefits.
- **Secure "Start Up Funds"** and "Earnest Money Funds" (ie Private Equity) to secure an exclusive due diligence period, preliminary plans, preliminary permits, and
- **Owner Participation:** Land subordinated for development, DEBT FREE, (eliminates the need for funds to purchase land), land owner becomes approx 1/3 investor
- **Secure initial seed money**: collateralize assets &/or sell: life insurance, precious metal, precious gem stones, IRA, retirement accounts, collectables (art, etc), future inheritance, vehicles, boats, planes, stocks, bonds, refinance other properties, mobile homes, friends, family
- **Presales commitments** from individual home "exclusive use" ownership buyers, Multi income opportunities of different size homes & investment variations
- **Secure Entitlements**: this phase typically ends when design / conditional use / preliminary permits are approved
- Secure **LOANS**

BLUE SERVICES WE PROVIDE

BLUE DESIGN & DEVELOPMENT SERVICES

- Collaboration & consulting
- Sustainable due diligence
- Blue & green architecture
- Assemble & manage experienced professional design consultant team
- Master plan
- Funding solutions
- Development management, Corporate Sustainability Report (CSR) project implementation

WATER RETROFITS, TRANSITIONAL BLUE EXISTING INFRASTRUCTURE UPDATES

- For existing obsolete buildings & facilities
- Master plan towards whole systems thinking
- Each piece builds upon next
- Fast, easy, inexpensive
- Residential: single family/ mobile homes/ vacation/RV's/condos/apartments
- Commercial
- Industrial
- Agricultural

ASSEMBLE & COORDINATE BRAIN TRUST OF WATER CONSULTANTS

- Who are experienced, fluent in the vocabulary of green design strategies, professional, trained / credentialed / licensed in their field of expertise, & often that they have Liability Errors & Omissions insurance as well
- Fire Protection
- Rain Water Harvesting
- Storm Drainage civil engineer
- Gray Water, Black Water, compost toilets, humanure
- Pools, hot tubs, ponds, fountains, waterfall
- Filters, vortex, crystal, alkaline
- Lab testing
- Smart metering

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KNOWLEDGE EXCHANGE SESSION
BLUE COMMUNITY COMMONS

WATER FACILITY COMMONS LEGAL FORM OWNERSHIP, (DRIVE THE SOCIAL ORGANIZATION)

- Smaller, cost efficient, affordable share units within reach for consumers.
- Common area vs.. exclusive use, Fractionalized, tenants in common, exclusive use, common area share,
- condo & town home with co-housing extra layer, lease to own, sweat equity, associations, rentals,
- Lease agreements, Land Trust preserve, Land user code, CC&R's , Land Covenant, Ultimate Blue-Green Building Charter, Sustainable Testing Site Act (NM), Special District Zoning (tiff & piff)
- –All may address cleaning agent restrictions, watershed flow, habitat enhancement, development restrictions, open space preservation

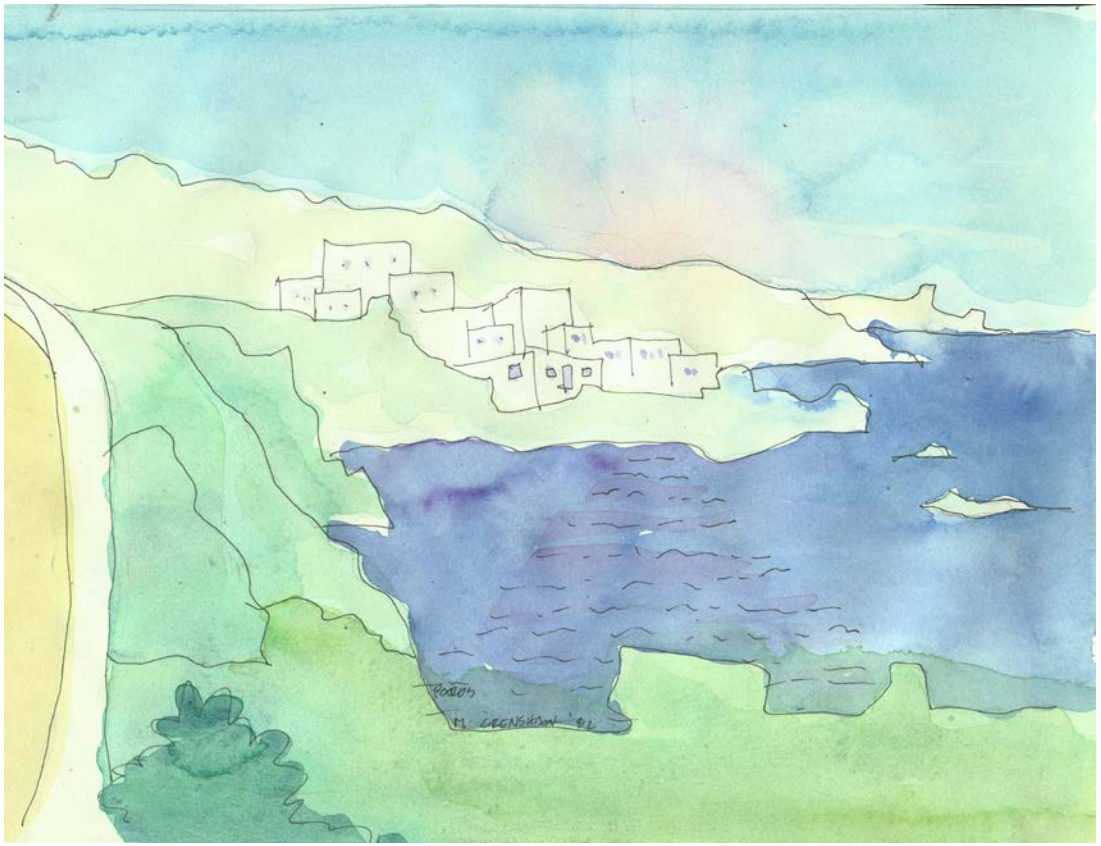
COMMONS WATER FACILITY FEATURES

- Occupant demand vs.. dedicated fire protection, vs.. emergency reserve, vs.. surplus
- Source & supply water system: potable, irrigation, storm,
- Waste water system: gray, black
- Filters, distillers, colored pipe protocols, pumps, receptor tanks, storage cisterns, retention, recharge, overflow, passive gravity drainage vs. tech hardware & software
- Water as thermal mass (temperature storage), solar thermal & hot water
- Stored water as stored energy micro hydro electricity
- Community Supported Agriculture (CSA), Orchard, vegetable, fish pond, & livestock food shares per person
- Community food preparation & storage, commercial kitchen, Seed bank & sanctuary to promote long term ability to grow food, Built in health care via medicine gardens
- Pools, spas, fountains, Water temple spiritual center, recreation amenities
- Water shed, aqueduct, & acequia Community Irrigation water use rights

COMMUNITY SURPLUS

- Abundant water resource capacity accommodates the possibility of community surplus, which means income / barter / trade
- Agriculture, food & beverage service
- Services, small biz production, visitors for education / recreation/ art / health care clinic- spa,
- **COMMUNITY INCOME**
- Create income stream from the eco village such as: renewable power, reclaimed water, education classes & workshops & tours, sublet the community room / conference space / common areas, commercial kitchen rentals, services, goods production, research & development grants, food, Community Supported Agriculture (CSA), spa treatments, temple activities, bed & breakfast, eco tourism, healing clinic, various non profit grants, youth programs, senior programs, traveling school, royalties, misc. rentals

KNOWLEDGE EXCHANGE URBAN WATER DUE DILLIGENCE



DEVELOPMENT PLANNING URBAN WATER DUE DILLIGENCE

- *Issues that could make or break a project*
- Rain Water Harvesting
- Conservation & alternative supply sources
- Hook ups available
- Fire Dept
- Property history
- Secure Supply:
- Black water due diligence
- Gray water
- Water pressure
- Municipal Water Meters

WATER SYSTEM COMPONENTS

INTEGRATED WATER MANAGEMENT STRATEGIES

- Supply: Rain Catchment, Wells, Municipal Metered Water, site Storm water collection, paving storm water collection
- Reclaimed: gray, black, imported waste, , industrial / commercial waste, condensate/ air to water/ dehydrator / distillers / vapor harvesting/humidity / evaporative cooling & whole house fans
- Demand: domestic, irrigation, comm, industrial
- Monitoring: Smart Building

SYSTEM FEATURES

- Supply collection in receptor tanks (gravity usual delivers to lowest topographic
- Renewable energy pumping up to highest topography (aim for 30 psi)
- Diversion & direction swales, gutters, pipe identification systems
- Demand Delivery to efficient appliances & fixtures & plants
- Drain used water to reclamation point
- Smarts controls
- Overflow

NET ZERO WATER

- Zero water means no importing:
  - Collect every drop from the sky that lands on all parts of the property
  - Reclaim & re-use over & over
  - Emergency reserve (from end of rainy season, to beginning or next rainy season, plus hold over reserve for drought & leak accidents (loss of storage)
  - Know your demand loads
- Zero energy means use what you generate
- Living building challenge

RETENTION & OVERFLOW SYSTEMS (WHEN ALL CATCHMENTS ARE FULL)

- Pervious paving with subsurface gavel or matrix reservoir retention
- Living green roofs retention
- Pond / borrows pit collect storm water at lowest point (as a receptor, then pump it back up to top to switchback drain back down again)
- Rock sub layer under planting areas for drought season access by landscape roots
- Percolation into the aquifer
- Finally divert it, (pre filter pavement runoff thru rain garden filers) into the watershed in steward fashion

HYBRID = LOW TECH HELPED VIA HIGH TECH

- Passive strategies: gravity drainage
- Green Energy: pumps & pressurization
- Smart Building Strategies: moisture sensors, occupant/motion sensors, flow meters, weather forecast, meter monitoring, use patterns, storage in supply, data loggers

OVERFLOW ABUNDANCE

- means to overflow. As a consultant affiliated with water systems, if your integrated water management design strategies have supply in abundant fashion, exceeding demand, then there will be enough for demand, emergency (leaks , contamination, fire, drought), surplus to allow commerce/trade/make a living/profit, percolate & recharge the aquifer in stewardship form, & still it will OVERFLOW, to the watershed.

FILTERS & PURIFICATION

- Silt filters for exterior ponds & pits
- Rain gardens for road vehicle run off
- Cat tail ponds
- Swimming Pools
- Desalinization & distillers
- Potable: UV lights, Sand, carbon, charcoal, crystal, vortex (clock wise vs.. counter clockwise, distilled, reverse osmosis, ionic
- Qualities: potable, clear domestic , above ground irrigation, subsurface irrigation, various comm'l & industry specifications

ROOF & CATCHMENT SURFACE MATERIAL CONCERNS

- Obviously the least chemicals possible
- Potable use: prefer factory baked enamel metal or glass surface
- Domestic & Food irrigation: if limited to galvanized metal or petroleum surfaces- use an ambitious filter & mycology
- Other uses lawns/commercial/industrial, then filter as per consultant recommends

CISTERNS & CONTAINMENT STRUCTURES

- New: prefab & site built- above ground, below ground, pillows
- Integrated with retaining walls & foundations
- Food grade liners
- Salvaged: barrels, food & beverage industry vats, hot tubs, shipping container open tops & with fluid hatch covers
- Repurposed vessels: busses, trains, containers, planes, vans, etc
- Green living roofs & living walls
- Permeable pavement with subsurface sponge
- Pools, ponds, & pits

MICRO HYDRO POWER

- Seasonal creek or river power
- Tidal
- Solar voltaic: water stored in top cistern makes hydro power when the water is let out via gravity
- Solar thermal
- Fuel cell
- Solar thermal

SUPERIOR AQUIFER STEWARDSHIP

- Use the wetlands as a pre-filter for all overflow water
- Assume that the exterior crops planted in ground will be percolating to the aquifer
- Try not to use any aquifer water as an example of
- Pursue the living building model of sizing the project to the capacity of the land & resources
- Grade & plant crops on the land in a gentle switch back (see Brand Lancaster's book for diagrams)
- At the low end of the property have a receptor pond with silt filter,
- Pump that up to high point of land with irrigation storage
- Likewise have a receptor tank for rain water catchment harvesting at lowest roof, & pump that up to a storage area at the high point of property for potable storage
- Winter creek & small wind turbine can provide winter renewable power.
- Solar panels can provide growing / sunny season power
- Reclaim black water, with either Advantex (need 4 acres per approx 25 acres subterranean irrigation to orchard trees to disperse the black water), or living machine tidal wetlands system.

AGRICULTURAL & LANDSCAPE

- Vegan embedded water per person
- Meat eater embedded water per person
- Gals h2o per calorie of different food crops
- Embodied water per crop: www.threadcollaborative.com
- Zeriscape, Local Natives
- Minimize irrigation loss via subsurface irrigation
- Grow inside glazed greenhouses, then harvest the condensate off of the ceiling

BLUE RESOURCES

JURISDICTION DUE DILLIGENCE STRATEGY,

- personal contact, speak their language (requires experience), Visit each dept with a site plan to determine what is approvable by them, only then start design studies
- Get client review & approval, then go meet with each dept. again to show them specific design studies
- Expedient permit approval means keep the design within the protocol of current regulation enforcement
- If design team & client patient, have luxury to pursue alternate innovative solution to achieve intent of regulations
- Bring the project jurisdiction dept an approved regulation from a different jurisdiction

EXAMPLE FINANCIAL INCENTIVES

- **Create Land Trust** deed for reduced property taxes in return to maintain as open space & no development on that portion.
- **Tax Benefit:** Past tax credit loss carry forward from agricultural venue, due to bee keeping contractor shortage, & reduced prior crops
- **Grant** for public out reach & education funds for the Permaculture Semi Urban Institute to help w/ operating costs
- **CSA** provides food shares for owners, has surplus income

MOST IMPORTANT JURISDICTION DEPTS

- FIRE- cistern reserve, fire fighting infrastructure
- ENVIRONMENTAL HEALTH- Sanitation, gray & black water
- PUBLIC WORKS- road drainage
- PLANNING- coastal commission, water shed, general environmental issues
- BUILDING DEPT- implements codes, plumbing codes

DEFINE SPECIALIZED USER GROUP COMMUNITIES DEMOGRAPHIC

- Soft due diligence packet talking papers to communicate about, explain, & pursue project
- Omnivore, musicians, artists, tech, research & development, think tank, industrial arts & crafts workshop, educational, healing center, family center, intergenerational integration, LOHAS retirement, vacation, survivalist retreat emergency resistant safe house for natural disaster / acts of god / failure of grid delivered services / civil unrest, war, corporate / political headquarters, hero brand pilot.
- Retired / seniors, students, vegans, omnivores, techies, inventors, artists, musicians, families, spiritual, healing
- Vacation homes
- Trailer parks, emergency response, mid term & long term solution housing
- Eco LOHAS baby boomers
- Resource extraction temporary labor camps

WHATS NEW
CAL GREEN CODE

- Effective Jan 1, 2011
- Now requires mandatory operations manual of all facility systems and
- Pre-Commissioning Plan submitted with working drawings as time of building permit application
- Lemonade out of lemons, more work for consultants in our field
- Commissioning after occupancy to make sure that systems were installed as designed, & operate as engineered, to meet the needs of the client, to train the maintenance & operations staff, & to train the owners
- Re-commissioning happens when occupant use changes, or when facility needs upgrade & or replacement
- This is a new industry

COMPONENTS OF A WATER OPERATION MANUAL:

- Statement of voluntary & mandatory green building rating matrix, & applicable codes
- occupant user demand volumes of use ,waste, reclamation & re-use
- System concept explanation: passive & active components, above ground vs.. underground, supply sources, conservation, collection, filtering/reclamation/reuse, storage structures, distribution, piping color code protocols, emergency reserve, dedicated fire reserves , pervious recharge, overflow, watershed & aquifer stewardship practices
- Schematic site plan diagram of the components, their location, & function
- Proprietary manufacturer's product specification sheets of all fixtures, appliances, equipment, materials, products.
- petroleum surfaces- use an ambitious filter & mycology, non potable uses lawns/commercial/industrial, then filter as per consultant recommends

COMMISSIONEING (Cx)

- The operation manual, engineering calculations, & construction documents become the road map for Commissioning
- **Basic commissioning**: is a process to help assure that building systems are designed, installed, tested, & able to be operated & maintained according to the owner's intent & needs.
- The Nat'l Conference on Bldg Commissioning has established an official definition of Total Building Commissioning as a "systematic process of assuring by verification & documentation from the design process to a minimum of 1 year after construction, that a facility systems perform interactively in accordance with the design documentation and intent, and in accordance with the owner's operational needs, including preparation of operation personal.
- When- the commissioning team may becomes part of the design & development team at the beginning of the design process. The earlier the better to avoid project change orders
- The Building Commissioning Association (BCA) https://netforum.avectra.com/eweb/StartPage.aspx?Site=BCA&WebCode=HomePage, believes that the CxA should represent the interests of the owner.
- Who:
- Under LEED http://www.usgbc.org/DisplayPage.aspx?CategoryID=19, & GSA, http://www.gsa.gov/portal/category/100000, the Commissioner must be an independent 3rd party.
- Under CAL Green Code, http://www.google.com/url?sa=t&rct=j&q=cal%20green%20code&source=web&cd=2&ved=0CCcQFjAB&url=http%3A%2F%2Fwww.documents.dgs.ca.gov%2Fbsc%2FCALGreen%2F2010_CA_Green_Bldg.pdf&ei=U_GETsuyGeXiiAKs9KGlDA&usg=AFQjCNFQKInWKXXlJXjrZoq9ptC0z6DsJg&sig2=Hl7ZoJ4zE_nrEQSbLMJ9wg , 3rd party is not required, can be part of the design team, construction team, or independent 3rd party.
- Commissioning helps the occupant learn how the systems are intended to operate
- Re-commissioning is appropriate when the occupant use & demand needs change, any of the water sources or strategies are no longer viable, maintenance, repairs, upgrades, improvements, water retrofits, and transitional blue existing infrastructure updates

WATER DESIGN RULES OF THUMB

- Rain Water collection:
- Length x width of roof surface x height of local rainfall, convert to cu ft, convert to gal/cu ft= total gal
- •Net zero water calculation, www.earthcraft.com
- Domestic water exiting a house:
  - 40-50% gray water
  - 50-60% black water
- Subsurface irrigation saves 50% of irrigation from drying / evaporation
- To grow food, the rain catchment surface must be 2.5 times larger than the cultivated area
- Remember air gaps to keep separate water systems from contaminating each other & use colored pipe protocols to identify different water supply & waste in each pipe
- Demand:
- •Domestic McMansion demand vs.... Off grid survival (120- 200 gpd for interior plus exterior vs.. 20 gpd potable per person for an earthship)

The Water & Energy Connection

- Embodied energy in water , The Carbon Footprint of Water-River Network-2009.pdf
- Embodied water in energy, water foot prints , http://www.waterfootprint.org/?page=files/home
- Embodied energy in food , organic.kysu.edu/EnergySmartFood(2009).pdf
- Embodied water in food , http://en.wikipedia.org/wiki/Virtual_water#Virtual_water_in_various_products , http://www.igd.com/index.asp?id=1&fid=1&sid=5&tid=157&foid=85&cid=326#3

Water Passive Design Tips

- Water can be thermal mass as a thermal heat storage battery
- Manage anti freezing of tank by geo-thermal(58 degree F constant) with berming, partial or full excavation into grade

Snow & Rain Design Orientation

- Gable over entry doors , steps, decks & patios (for reduced maintenance & liability)
- Gutter or lowest horizontal: relate to catchments & precipitation storage, not over egress, parking, pedestrian or vehicle circulation, delivery areas, circulation or

BLUE LINKS

GREEN BUILDING RATING SYSTEMS

- LEED / USGBC , *www.**usgbc**.org/**LEED**/*
- Energy Star , http://en.wikipedia.org/wiki/Energy_Star
- Nari , http://www.nari.org/certify/index.asp
- Nahb , http://www.nahbgreen.org/Certification/ngbs.aspx
- Green Globes , http://www.thegbi.org/green-globes/ratings-and-certifications.asp
- CASBEE (Comprehensive Assessment System for Building Environmental
- Efficiency) , http://www.ibec.or.jp/CASBEE/english/
- BREEAM (Building Research Establishment's Environmental Assessment
- Method) , http://www.breeam.org/
- GBTool , http://www.iisbe.org/gbc2k/gbtool/gbtool-main.htm

WATER PROTOCOLS

- Sustainable Sites http://www.sustainablesites.org/report/
- LID Low Impact Development http://www.lowimpactdevelopment.org/publications.htm
- Arcsa Manual- www.**arcsa**.org/files/TCEQPublicRain**water**.pdf
- IRCSA, www.enhealth.nphp.gov.au/council/pubs/pdf/rainwtr.pdf
- Green Plumbers www.pacesupply.com/cms/education/gpmcs.pdf ,
- Living Building Challenge (LBC) https://ilbi.org/lbc/Standard-Documents/LBC2-0.pdf
- Bonn Charter http://www.iwahq.org/cm
- Water Sensitive Urban Design , (WSUD) http://www.planning.sa.gov.au/go/wsud#wsud-guide
- Facility for Advancing Bio-filtration (FAWB) http://www.monash.edu.au/fawb/products/
- Life Cycle costing, www.pepipe.org/uploads/pdfs/**Life_Cycle_Cost**_Study.pdf
- WUCOLS www.ucce.ucdavis.edu/files/filelibrary/1726/15359.pdf
- Texas Manual on RainWaterHarvesting , The Texas Manual on Rainwater Harvesting
- Cradle to Cradle , http://en.wikipedia.org/wiki/Cradle_to_Cradle_Design
- Tree benefit calculator http://www.treebenefits.com/calculator/treeinfor.cfm?zip=&city=&state=&climatezone=Inland%20Valleys:
- Best Practices , http://en.wikipedia.org/wiki/Best_practice
- Lean, http://www.design-for-lean.com/lean%20design.html , http://en.wikipedia.org/wiki/Lean_manufacturing
- Net Zero, *www.nrel.gov/docs/fy06osti/39833.pdf* , http://en.wikipedia.org/wiki/Zero-energy_building ,
- Passive House , http://www.passivehouse.us/passiveHouse/PHIUSHome.html

WATER NGO & NON PROFIT ORG LINKS

- Well projects in Africa, founded by the 3 athletes in “Running The Sahara”, http://www.h20africa.org/
- World Water Forum , http://www.worldwaterforum6.org/en/news/
- World Water Council, http://www.worldwatercouncil.org/
- Peoples Water Forum, http://peopleswaterforum.org/
- UN World Water Assessment Program (WWAP), UNESCO , http://www.unesco.org/water/wwap/wwdr/wwdr3/
- International Institute for Sustainable Development (IISD) , thirds world water forum, http://uncsd.iisd.org/news/third-world-water-forum/
- Third World Water, http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/EXTMNAREGTOPWATRES/0,,contentMDK:20536153~menuPK:497170~pagePK:34004173~piPK:34003707~theSitePK:497164,00.html
- Right Of Water , http://www.righttowater.info/timeline-of-international-conferences/
- UN Habitat , http://www.unchs.org/content.asp?cid=1354&catid=649&typeid=8
- Pacific Water , http://www.pacificwater.org/
- International Commission on Irrigation & Drainage, http://www.icid.org/
- Third World Center for Water Management, Mexico , http://www.thirdworldcentre.org/english.html
- Klamath sustainable community link portal, http://www.klamathsustainablecommunities.org/info/links.shtml
- Water Sensitive Urban Design , http://www.wsud2012.com/
- International Water Association (IWA) , http://www.iwahq.org/1nb/home.html
- International Rain Catchment Systems Assoc (IRCSA), http://www.ircsa.org/
- International Rivers Network, http://www.internationalrivers.org/
- Gyre Aquaponics, http://www.gyrecleanup.org/csaaquaponics/

CODES WITH WATER IMPACT

- NSF (paid not free) http://www.nsf.org/business/standards_and_publications/
- CA Gray Water Code, www.hcd.**ca**.gov/**codes**/shl/Preface_ET_Emergency_**Graywater**.pdf
- CA green Code **2010 California Green Building Standards (CALGreen) Code** (PDF),
- CA plumbing code www.iapmo.org/**California**%20Plumbing%20**Code**/Chapter%2004.pdf
- Western State Water Laws, http://www.blm.gov/nstc/WaterLaws/appsystems.html
- ICC Internat'l Code Council (paid not free) http://www.iccsafe.org/Store/Pages/eCodes.aspx
- The Organic Administration Act, http://www.fs.fed.us/forestmanagement/aboutus/histperspective.shtml
- Water Australia Policies , http://www.environment.gov.au/water/policy-programs/index.html
- AB 32, *www.arb.ca.gov/cc/factsheets/**ab32**factsheet.pdf* , http://www.arb.ca.gov/cc/ab32/ab32.htm ,
- New Mexico Sustainable Testing Site Act , HBO 269 , http://www.earthship.org/HB0269.pdf

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Films on Water Issues

- Swim For The River, http://www.swimfortheriver.com/
- Blue Gold, http://www.bluegold-worldwaterwars.com/
- Thirst, http://www.thirstthemovie.org/
- Flow for The Love Of Water , http://www.flowthefilm.com/
- Tapped , http://www.tappedthemovie.com/
- Water: The Great Mystery, http://topdocumentaryfilms.com/water-great-mystery/
- Frontline: Poisoned Waters , http://www.pbs.org/wgbh/pages/frontline/poisonedwaters/view/
- Bee Colony Collapse, http://www.pbs.org/wnet/nature/episodes/silence-of-the-bees/full-episode/251/

BOOKS & PUBLICATIONS ON WATER ISSUES

- The Water Seekers, by Remi Nadeau, http://www.archive.org/details/waterseekers00naderich
- Cadillac Desert , http://en.wikipedia.org/wiki/Cadillac_Desert
- The Fifth Sacred Thing, Starhawk, http://www.starhawk.org/writings/fifth-sacred-thing.html
- US Forest Service , http://www.fs.fed.us/pnw/publications/gtrs.shtml
- Biomimicry, http://www.amazon.com/Biomimicry-Innovation-Inspired-Janine-Benyus/dp/0688160999
- Mycelium Running, Paul Stamets, http://en.wikipedia.org/wiki/Mycelium_Running
- Rain Water Harvesting , Brad Lancaster , http://www.harvestingrainwater.com/

BLACK WATER REMEDIATION SYSTEMS

- Ozziclean , http://www.ozzikleen.com/
- Advantex , http://www.orenco.com/ , http://www.anchoragetank.com/Septic_Systems/AdvanTex/advantex.html , http://www.fextex.com/16.html
- Living Machines , http://livingmachines.com/ , http://worrellwater.com/ ,
- Aquacell , http://www.aquacell.com.au/ , http://www.dewater.com/content.php?url=News-Events/aquacell-Water-Recycling-Solutions-Appoints-U.S.-Distributor
- Eco Machine , http://toddecological.com/eco-machines/, http://toddecological.com/
- Pirana , http://www.pirana.biz/
- Earthship Biocells , http://ns1.earthship.com/sewage-treatment
- Watson Wick , http://www.oasisdesign.net/compostingtoilets/watsonwick.htm
- Cat tail ponds , http://cleantechnica.com/2009/05/16/cattail-army-deployed-to-fight-water-pollution/ , www.epa.gov/owow/wetlands/pdf/design.pdf

WATER HEROES

- Art Ludwig , www.oasisdesign.net
- Michael Reynolds, www.earthshipbiotecture.com
- Brad Lancaster, www.harvestingrainwater.com
- Rudolf Steiner, biodynamic water , http://en.wikipedia.org/wiki/Anthroposophy#Biodynamic_agriculture
- Bill Mollison, Permaculture http://en.wikipedia.org/wiki/Bill_Mollison
- Andy Lipkis, Tree People, http://www.treepeople.org/andy-lipkis-founder-and-president
- Dr. Jim Gill, Water Australia , http://www.nwc.gov.au/www/html/1083-water-australia-launched.asp?intSiteID=1