THE HYDRO-LODGE-ICAL CYCLE

ON-SITE WATER MANAGEMENT STRATEGIES

FROM A RURAL PERSPECTIVE

PRESENTED BY
AQUARIAN SYSTEMS INC.

MAIN FEATURES

- RAINWATER HARVESTING & STORAGE
- USE OF RAINWATER INDOORS AND OUT
- WASTEWATER TREATMENT BY WAY OF LANDSCAPING:
  - GREYWATER TREATMENT PLANTERS
  - ENGINEERED WETLANDS
  - EVAPOTRANSPIRATION GARDENS
  - DRIP IRRIGATION
- WATER CONSERVATION WITH:
  - LOW FLOW FIXTURES
  - COMPOSTING TOILETS
- ON-SITE INFILTRATION OF STORMWATER

RAINWATER CATCHMENT AND USE

10,000 Gal. concrete cistern under house. Cistern bypass infiltrates garden soil.

- Strainer baskets catch roof debris allowing for easy access and cleaning
- Rainwater then drains to cistern or bypass to garden

WATER CLOSET

- PVC pipes from cistern (bottom left hand corner)
- Pump (on floor)
- Pressure tank (blue tank)
- Particulate filter (small filter on wall above hot water tank)
- Ultra-Violet filter (on wall)
- Hot water tank
- Supply line to house plumbing system

- Particulate filter removes suspended solids
- Ultra-violet filter disinfects, removing pathogens

HEDGE IRRIGATION USING RAINWATER RUNOFF

Gravity at work

Overflow to drip lines

Gravity feed to soaker hoses

In-line filter

Soil infiltration during irrigation bypass mode in winter.

- Trees absorb carbon dioxide at an ever increasing rate as they mature.

- Mature trees will provide a wind buffer helping to deflect winter's cooling winds.

- Vegetation reduces stormwater runoff by absorbing and slowing the movement of water.

- Trees shade the ground thereby cooling the surface of the planet.

GREYWATER TREATMENT USING PLANTERBEDS

GHOSTS

(GreenHouse Organic Sewage Treatment Society)

Greywater Pilot Project

Distribution Laterals

Flood chambers on laterals

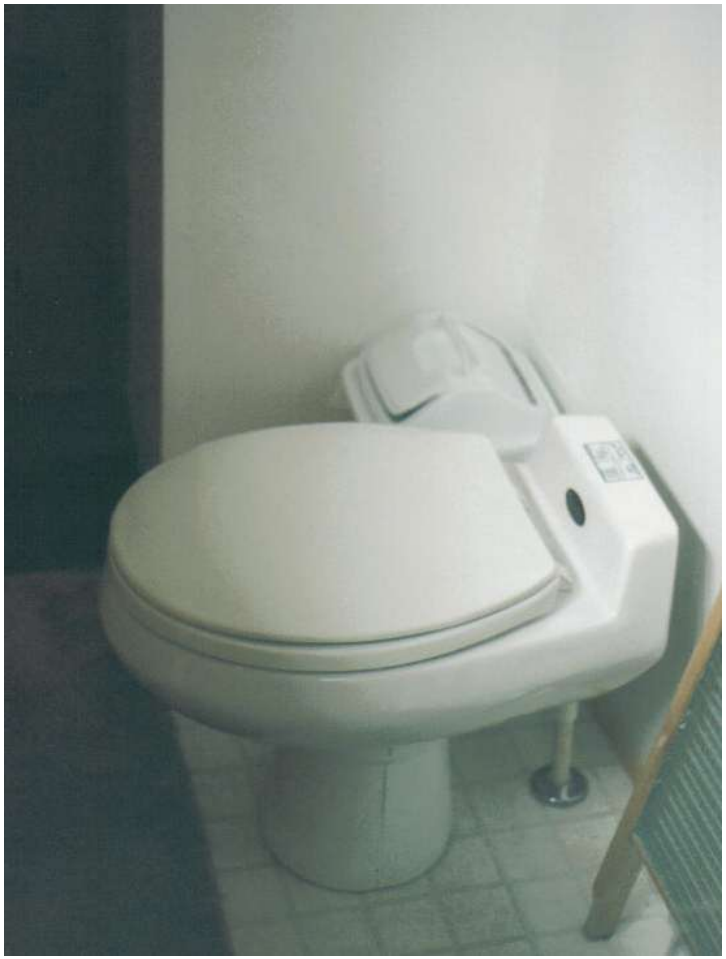
Water Independence

- All water used in this house is harvested from the roof.
- 3000 imp. gal. plastic cistern
- 1 Pint flush composting toilet
- Planter bed for greywater treatment.
- In-door summer temperatures reduced by shading from vegetated planter.
- Drainage from planter used for landscape irrigation.
- Compost from toilet used as soil amendment.

Roof collection system

Sun-Mar composting toilet

1 liter flush toilet



Close up of membrane lined, cedar clad, greywater planter. Flowers in foreground irrigated with planter drainage

Greywater treatment planter as an integral component of landscape architecture.

Cooling summer shade

All household water collected from roof.
3000 imp. gal. capacity, tucked away at back of house.

Overflow infiltrated to local soils

Compost/Dry Toilet

- Composting bin
- Access hatch for monitoring, maintenance and removal of composted material
- In-house toilet directly above composting bin

Dry toilet
(non-flush)

Compost used as soil amendment for rose bush

Compost could be used as soil amendment for planter and covered with bark mulch.

Planters for treating onsite sewage

Pre-cast well rings for planters

Sewage treatment blends with landscaping

GRAND OPENING!

Hornby Depot
Composting Toilet Facility

*recycle
*reuse

*protect the environment

12 Noon
Saturday, Feb. 18
Come Celebrate!

*ribbon cutting
*drumming
*hot bowls of chili
*educational tours

Education for the 21st Century

FEATURES OF THE FACILITY:

*rainwater catchment and dispersal
*greywater treatment
*vermiculture composting of solid waste
*solar-powered ventilation system
*alternative construction materials ... and more

Wall materials

Crushed and baled tin cans and old hot water tanks create the shape.

Public sorting area

Tin can processing area

Tin can baler

Mortared like bricks

Gourd plants in evapo-transpiration garden receive water from hand basins and urinal.

Evapotranspiration bed

EPDM rubber membrane

Drain port with overflow standpipe

Crushed glass aggregate

Sand layer to provide for capillary action and evaporation from surface.

Vine trellis made with recycled bicycle rims

Maturing gourd

Terraced evapo-transpiration garden (recycled rubber tires) receives compost leachate & roof water during dry season and overflow (if any) from evapo-transpiration wetland at front of building.

Terraced garden 1 ½ years later

Roof water collection for hand basins

Passive solar vent on roof

Entryway garden feature irrigated with rain water from roof

Soil infiltration trench for roof runoff

Composting chamber access

Composting worm bins

Toilet chute

URINAL AND TOILET

Mature compost

CONSTRUCTED WETLANDS

Constructed wetland for residential sewage treatment.
Freshly planted

Mature vegetation in constructed wetland

Septic tanks preceding wetland

EPDM liner
and inlet distribution pipe

Tribune Bay Outdoor Education Centre

Bulrush prior to planting

Mature vegetation

AQUAPONICS

Integration of fish rearing and gardening

Hornby Community School Science Fair

Harvesting of the sunflower sprouts

Goldfish tank

Filter/growing medium and bell siphon

Seedling Nursery

CLIMATE CHANGE AND BEST WATER MANAGEMENT PRACTICES

- Increase in local vegetation humidifies and cools the air by way of evapo-transpiration from the surrounding soil and vegetation.
- Shade provided by vegetation reduces in house temperatures.
- Cooler temperatures reduces the use of air cooling devices thus reducing energy demand, consequently reducing greenhouse gas emmissions.
- Greenhouse gases are absorbed from the atmosphere because of increased vegetative growth.

ASK NOT ONLY:
HOW WILL OUR WATER SUPPLY BE EFFECTED BY CLIMATE CHANGE?

BUT, ALSO,
HOW WILL OUR WATER MANAGEMENT PRACTICES EFFECT CLIMATE CHANGE?

CHEMICAL HAZARDS TO LOCAL WATERS

- M**edications** and other chemicals such as **cosmetics** and **cleansers** persist in the environment, traveling beyond the septic field or sewer discharge pipe.
- Research shows that the root zone and surrounding rhizosphere has the capability of breaking down complex compounds into their constituent elements.

PHYTOREMDIATION

Phytoremediation involves the use of vascular plants, algae, fungi, and soil micro-organisms to remove and control waste or spur waste breakdown.

RECOMMENDED READING

"Phytoremediation: Transformation and Control of Contaminants"

Edited by Steven C. McCutcheon and Jerald L. Schnoor

Published 2003

AFFORDABLE COMMUNITY HOUSEING

A CONCEPTUAL MODEL

INCORPORATING HYDRO-LODGE-ICAL DESIGN PRACTICES

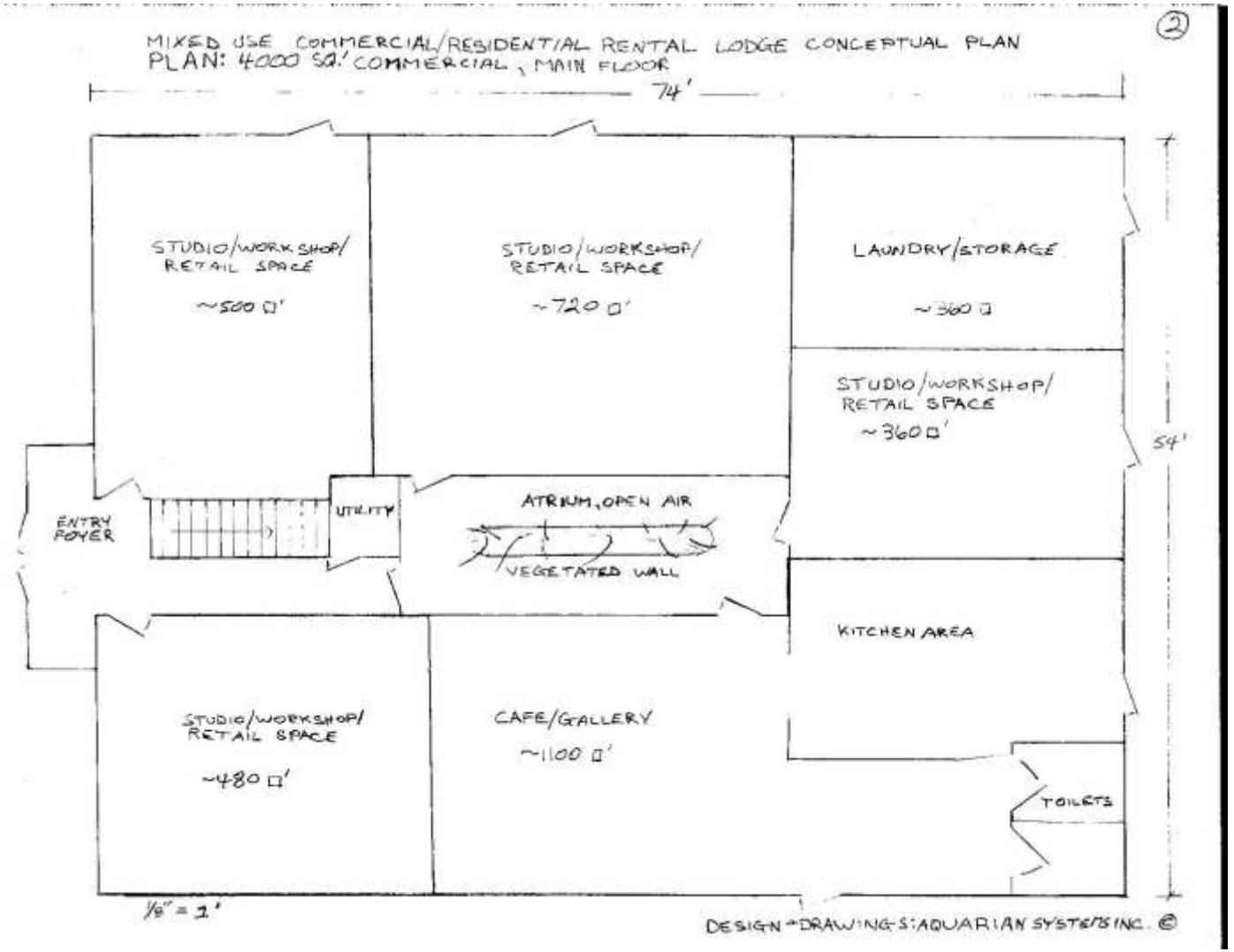
3 STORY, 4000 SQ. FT.

- HOUSING 18 – 20 PEOPLE IN STUDIO, AND ONE AND TWO BEDROOM APTS.
- 4 STUDIO/WORKSHOP/RETAIL SPACES
- CAFÉ, KITCHEN, GALLERY SPACE
- WASTE TO WEALTH WATER MANAGEMENT STRATEGIES

INTENTS

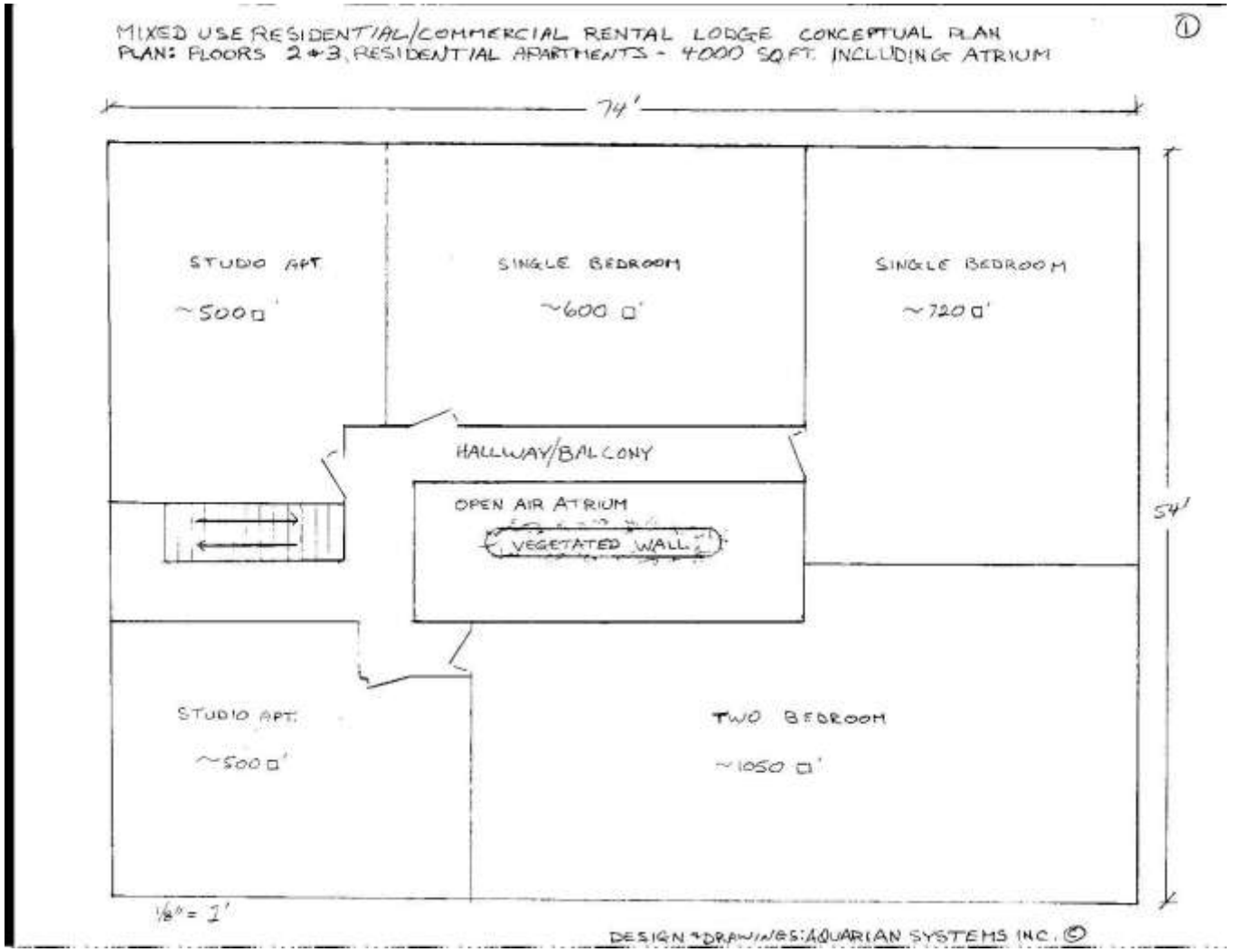
- PROVIDE AFFORDABLE HOUSING
- FOSTER ECONOMIC OPPORTUNITY
- CREATE COMMUNITY
- WATER MANAGEMENT INTEGRATING STRUCTURAL, SOCIAL, AND ECOLOGICAL PRINCIPLES
- NOURISHMENT OF BODY AND SPIRIT

GROUND FLOOR
STUDIO/WORKSHOP/RETAIL



2ND & 3RD FLOORS

RESIDENTIAL



SECTION: WATER COLLECTION/VEGETATED WALL

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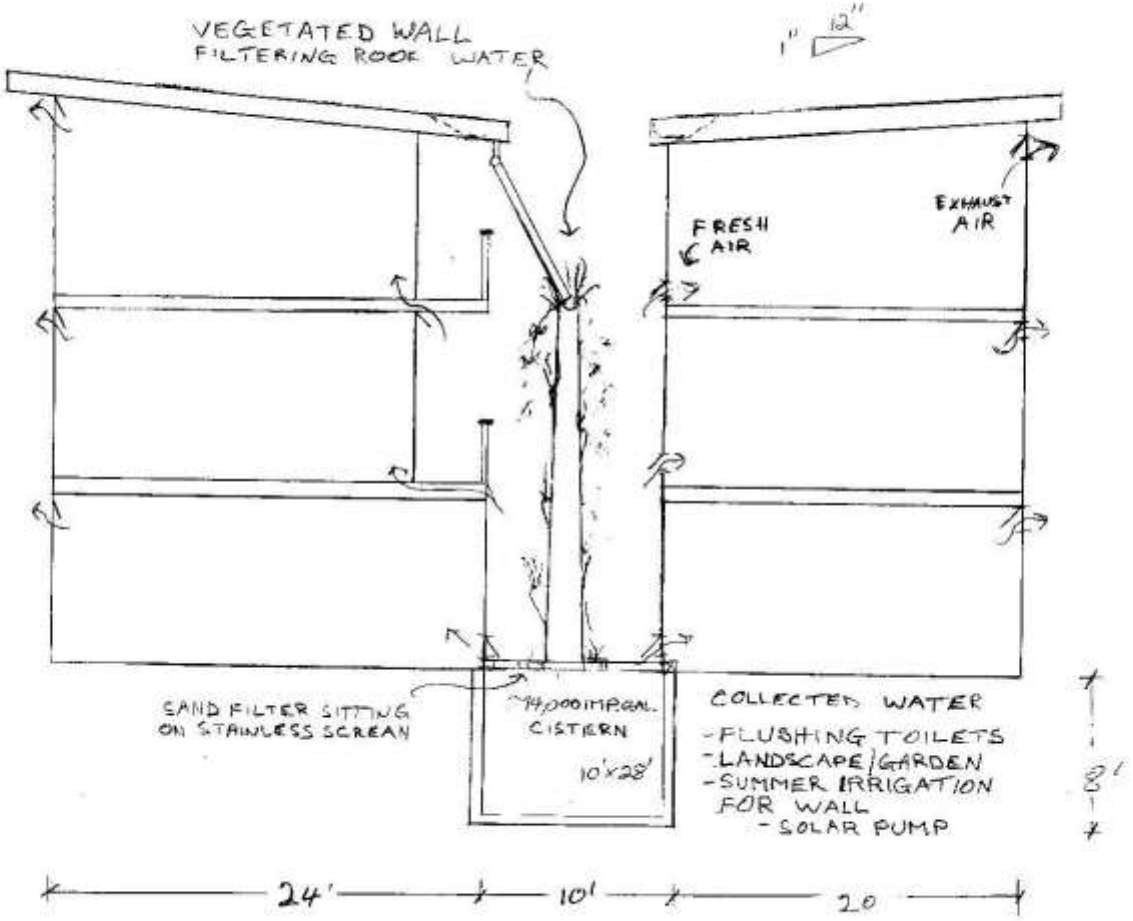

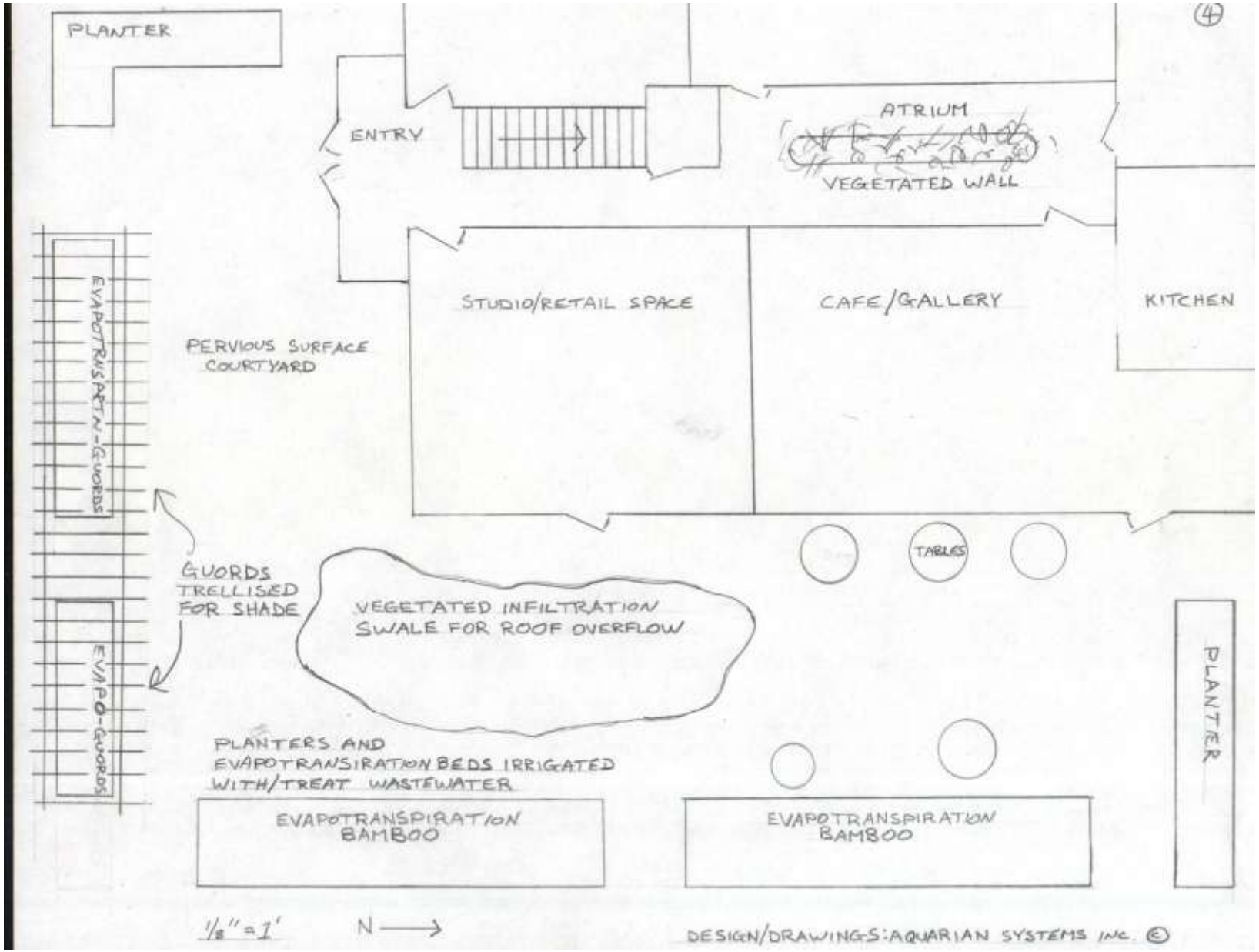
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PLANTER
ENTRY
ATRIUM
VEGETATED WALL
STUDIO/RETAIL SPACE
CAFE/GALLERY
KITCHEN
PERVIOUS SURFACE COURTYARD
EVAPOTRANSPIRATION-GUORDS
GUORDS TRELLISED FOR SHADE
EVAPO-GUORDS
TABLES
VEGETATED INFILTRATION SWALE FOR ROOF OVERFLOW
PLANTER
PLANTERS AND EVAPOTRANSIRATION BEDS IRRIGATED WITH/TREAT WASTEWATER
EVAPOTRANSPIRATION BAMBOO
EVAPOTRANSPIRATION BAMBOO
1/8" = 1'
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DESIGN/DRAWINGS: AQUARIAN SYSTEMS INC. ©

ENERGY SAVING FEATURES:

- Optional drying racks in laundry area
- Exercise room with electricity generation capability
- Rooftop solar hot water heaters
- Photovoltaic roofing materials
- Passive air conditioning
- Maximize natural lighting
- Growing raw materials for craft work onsite
- Living and working onsite reduces vehicle use

AQUARIAN SYSTEMS INC.

Consultation, Design, and
Construction of:

- Rainwater Harvesting Systems
- Onsite wastewater management
- Planter Bed Greywater Treatment
- Composting Toilets
- Engineered Wetlands
- Stormwater management
- Residential or commercial buildings integrating, sky to soil water management, and landscape architecture

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