

RECYCLE
Resource Recovery in Belmont Massachusetts

by

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Abstract

A potential threat to the earth's ecosystem and the people and animals living here is improper disposal of trash. The average American throws away 3.5 pounds of trash daily. While we have focused our concerns on the arms race and other looming and important issues, the day to day levels of trash coming from our homes and industries continues to grow. In many areas of the country landfills are closing and communities are struggling for solutions.

The information uncovered while researching this topic reveals that this situation can be addressed and handled responsibly. In order to achieve such success people must be willing to change their habits, work together, and take the time to retrieve and recover valuable resources from the "waste" stream. By doing so a significant amount of money, energy, and resources will be conserved. This thesis is an exploration into the ways a suburban community might proceed to do this in a useful and a meaningful way.

A site in Belmont, Massachusetts was chosen to illustrate this proposal.

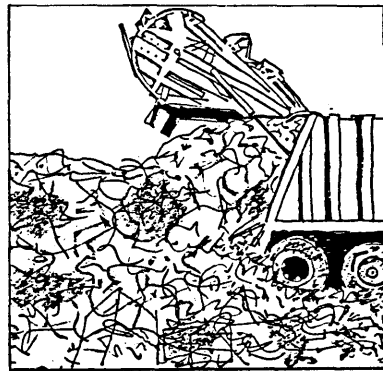
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I. Comparison of Waste Management Practices

The following discussion is a comparison of the three current methods of handling the domestic waste stream. The first two approaches, landfills and incineration, regard waste in the traditional manner, that is, as rubbish to be discarded. Recycling, in contrast, sees tremendous value in the waste stream and strives to recapture it.

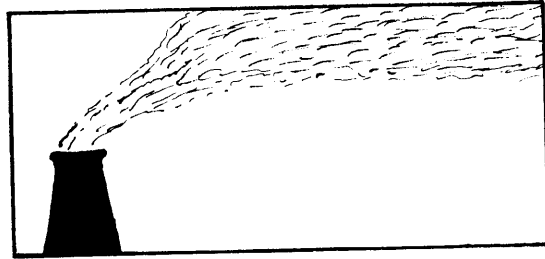


Landfills

From antiquity to the present the primary strategy for disposal of solid waste has been to dump it on the land. Optimally, this is an acceptable strategy for only 15 - 25% of the waste stream. The current practice of disposing of the remaining 75 - 85% of the waste stream in this fashion is unnecessary and irresponsible.

Pollutants from landfills, whether covered or not, can become mobile in the course of normal decomposition. When water from rain or from the waste itself permeates the landfill, the water is initially rendered acidic by biochemical processes. The acidic water percolates through the waste, dissolving elements and compounds from the waste to form a highly contaminated solution known as leachate. If a landfill's capacity to hold water is exceeded, leachate escapes into the environment in unpredictable quantities, concentrations and directions. Surrounding surface waters, aquifers and entire ecosystems are often contaminated and damaged by leachate. (#1)

1. Half of the existing landfills in America are slated to close by 1995.
2. No region is running out of dumps more rapidly than New England.
3. Ten million tons of waste was exported from New England in 1988.



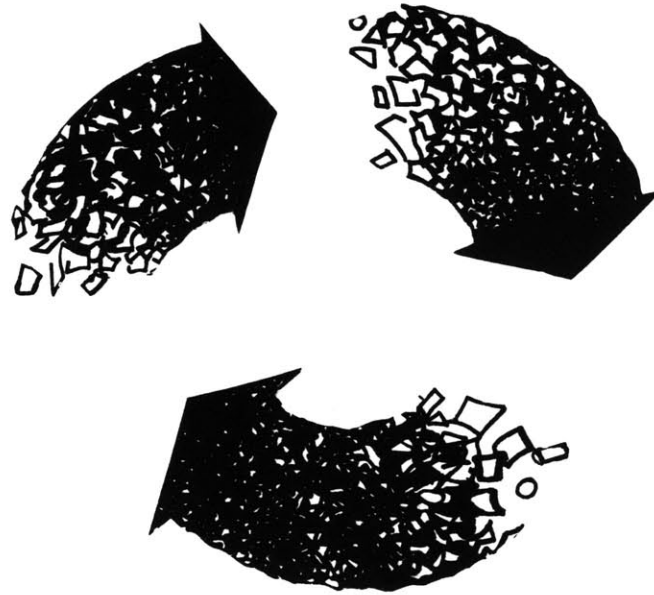
Incineration

Incinerators do not make landfills obsolete. Burning creates ash amounting to 20-30% of original weight, and 10% of original volume. What remains consists of clinkers and bottom ash. This residue is placed in landfills.

While incineration reduces the volume and tonnage of material for burial, this process and the waste it creates is more problematic. Operating these plants affects the air we breathe and the water we drink.

The solid waste from incinerators contains high concentrations of toxic metals, introduced by, among other things, the disposal of batteries from household items such as radios, watches, and video cameras.

Incinerators produce a filthy brew of greenhouse gases, including sulphur dioxide, nitrogen oxides, hydrogen fluoride, and carbon monoxide, contributors to acid rain and global warming trends. In addition, these emissions contain heavy metals: cadmium, chromium, arsenic, mercury and lead, known to cause birth defects and nervous system disorders. Some of these metals can be scrubbed out of emission gasses, but they end up as ash. Traces of cancer causing dioxin have been found in both gaseous emissions and ash samples. One form of dioxin: 2,3,7,8 TCDD is the most toxic molecule ever created. A regulatory loophole exempts incinerator ash from hazardous waste regulations, even though it often fails the Environmental Protection Agency's own toxicity and leachability tests. Recent events demonstrate that the toxicity of ash makes it an undesirable commodity. Prohibitively high domestic ash disposal costs has compelled the city of Philadelphia to hire a fleet of ships to get rid of its toxic ash. The infamous Khian Sea has unsuccessfully searched for dumping grounds in the Caribbean, Central America, Africa, and Sri Lanka. (#2)



Recycling

Recyclers regard the waste stream as a source of valuable materials which can be recaptured and reused. They recognize that significant savings can be realized by recovering discarded materials, simultaneously avoiding much of the environmental pollution created by landfills and incinerators.

For every ton recycled, a ton of waste is diverted from costly landfills and even more costly incinerators. As Barbara Goldoftas of Technology Review states: "What we need to do is recycle garbage, not just move it through one more machine." (#3)

One of the best places to begin recycling trash is in the home. The recycling industry requires and pays more for a clean, reliable, and consistently pure stream of raw materials. Resources separated at the source, such as the home, create a higher quality recyclable material than those separated from garbage which is collected at the curbside.

Furthermore, if the sorting occurs in the home and materials are transported by the homeowner to a resource recovery site, the consumer in effect donates his or her labor and therefore saves the community money that would otherwise be paid to 'sanitation workers'.

Communities should provide a site that can accommodate all components of the waste stream, from car and flashlight batteries, to books and toys, and even tires and car waste oil. If they do not, these items, many of them hazardous waste materials, which are customarily refused disposal at community landfills, will find their way into abandoned lots and rural back roads, and eventually into the water table.

There are certain materials which communities may have to pay haulers to transport from the resource recovery site to industry. At first glance this may appear foolish economically, however, this cost is usually much less than having trash taken to a landfill or incinerator, where the tipping fee will run between \$75 and \$125 in 1989 dollars.

Breakdown of the waste stream from an average American home: (#4)

| | | |
|-------------------|--------|-----------------------------------|
| <u>Paper</u> | 37.9 % | 22% of which is newspaper. |
| <u>Plastics</u> | 6.9 % | |
| <u>Metals</u> | 8 % | |
| <u>Glass</u> | 8.6 % | 80% clear, 15% green, 5% amber. |
| <u>Yard Waste</u> | 20.1 % | |
| <u>Food Waste</u> | 8.1 % | |
| <u>Other</u> | 10.4 % | (rubber, leather, wood, textiles) |

(Sewage not included in these figures)

Paper 37.9 % of domestic waste stream (DWS) 22% is newspaper

Producing one ton of paper from recycled fibre saves some 17 trees(3,700 pounds of pulp), 24,000 gallons of water, and enough energy to heat a house in New England through the winter. (#5) All grades of paper can be recycled repeatedly. Paper is made from fibre, be it cotton, wood, etc. Over time as paper is recycled these fibres break down into mush and no longer have tensile strength. This 'mush' can be blended with new paper fibre thereby extending the life of the recycled material. Recycling the print run of a Sunday edition of the New York Times would leave 75,000 trees standing.

Plastics 6.9 % of DWS

The technology exists to recycle certain plastics. Agreement must come from producers and consumers which will mandate the production of only those plastics which can be recycled.

Metals 8 % of DWS

Americans throw away enough aluminum to rebuild the entire commercial air fleet every three months.(#6) Melting down a ton of aluminum cans saves 8,800 pounds of bauxite and 1,000 pounds of petroleum coke.(#7) Aluminum is the most energy intensive material in common use. Each recycled beverage can saves the energy equivalent of 1/2 a gallon of gasoline.(#8) Aluminum can be recycled indefinitely.

Glass 8.6 % of DWS

Americans throw away enough glass bottles to fill the 1,350-foot twin towers of the New York World Trade Center every two weeks.(#9) Glass can be recycled indefinitely. New glass making systems can run exclusively on cullet (crushed glass).

Compost 20.1 % of DWS +

Food Waste 8.1 % of DWS totals 28.2%

It is possible that a large portion of this segment of the waste stream could be composted in our own back yards.

France has over 100 plants producing over 800,000 tons of compost a year. Sixty percent of the vineyards in southern France use compost and report increased yeields. Corn plots treated with compost and fertilizer in Minnesota achieved yields 17% higher than plots treated with fertilizer alone.(#10)

Japan and the Netherlands collect more than 1/2 their aluminum, paper , and glass for recycling. In effect, these countries require no raw materials for making paper and glass one year out of two.(#11)

It is incorrect to state that landfilling and incinerating trash should never be used again as a way to handle our waste. A small portion of the waste stream is most effeciently managed in this way. However, recycling is clearly a choice which holds great promise since it results in the conservation of energy, raw materials and financial capital.

Future economic expansion depends on the efficient marshalling of energy, raw materials, and financial capital. Tens of billions are spent to dispose of wastes. Billions more are spent to clean up environmental damage. If it can be cleaned up at all. The countries that make the transition to a recycling society will have the healthiest environments and the strongest economies.
(#12)

II. Theoretical Framework

As demonstrated in the previous discussion, recycling offers a viable and desirable alternative for handling domestic waste. By using landfills and incinerators, we make unavailable valuable resource materials which could otherwise be recovered, resulting in tremendous savings for industry, consumers, and townships. By continuing to advocate these two technologies to handle the domestic waste stream, we ignore an alternative filled with tremendous potential benefits.

Consider these facts: the average American creates and disposes of 3.5 pounds of garbage a day, roughly 1,300 pounds of garbage a year. "Municipal solid waste alone accounts for 140 million metric tons per year."(#13)

Towns, such as Seattle, Washington and Wellesley, Massachusetts, have already proven that at least 50% of the domestic garbage waste stream can be successfully recovered. If such a success rate were applied nationwide it would result in roughly 80 million tons of trash recycled, all of it captured from incinerators and landfills.

This is not to say the practice of dumping and burning should be wholly abandoned, but their use should be curtailed and brought to bear on that portion of the waste stream for which there is no other alternative. Communities must take the time to consider the situation fully and make thoughtful decisions about which method they choose to manage their waste and what percentage of their waste will be processed by each method.

We stand at a crossroad, a unique point in history, and have the opportunity to examine the choices we are making, the actions we are taking. We must act positively as we move into the future.

At the root of the decisions that face us, is a question which Wendell Berry frames as follows:

The question to be addressed is how to care for each of the planet's millions of small pieces and parcels of land ... our understandable wish to preserve the planet must somehow be reduced to the scale of our competence. (#14)

Phrased more succinctly, how does one : "Think globally - Act Locally" ?

Each person has different feelings regarding the need to recycle. Some feel there is absolutely no need whatsoever. Others recognize economic benefits, while many regard it as a chore and/or agree to participate because of peer pressure and a vague notion of civic responsibility. Still others regard it as a way to return energy to the earth, out of respect for the earth's support of them.

It is with the views of this last group that I align myself. It is a group of people made of up poets, humanists and environmentalists such as; Henry David Thoreau, the noted turn of the century Trancendentalist, Gary Snyder, poet, and Wendell Berry, humanist and social thinker. A recurrent theme throughout their writings is the need for a place which will foster a renewed appreciation for the earth, and help reestablish a sense of community among people.

As a framework within which to explore these beliefs, I chose the design of a resource recovery and recycling center, in the suburban community of Belmont, Massachusetts. The following discussion illustrates the beliefs which form the "foundation" for this thesis.

Every individual and community must address the issue of waste, pollution and recycling in their own way. It is my belief that we should respond positively and proactively to the crisis by recycling as much of the waste stream as possible. To do so we must begin by creating a place where recovered materials can be collected prior to being taken away for recycling.

As an architectural thesis: the design of this space must support and nurture the human spirit. It must be a place which will enable a visitor to cast off worldly pressures and reconnect with one's self. It is a specific territory within a bustling world; a regenerative, abundant place. It is an intricately used landscape; a series of discreet spaces, woven and blended together, signifying an overall process of transformation and regeneration. One enters into this place and hopefully becomes a part of it, for it is through becoming a part of the landscape that one can develop a true sense of responsibility for the environment. The following excerpts express the power of and need for such a place:



The creation of place may occur as sensitively as the way in which a wild animal approaches a watering hole for a drink.
(a)

The first great consideration is that life goes on in an environment; not merely in it but because of it, through interactions with it. The career and destiny of a living being are bound up with its interchanges with its environment, not externally but in the most intimate way. (#15)

The promise here is that people properly grounded in a complete and rounded environment could begin to get a better feeling for the day to day aspects of the many multigenerational decisions in modern life - those actions we initiate which pile up assets or debts for our children and grand children. If our own landscapes could help us live more lightly, it would be easier for us to feel the weight we were piling on the backs of the people who will be arriving here in a few years. By inadvertently severing connectedness and thus dulling some of our own awareness, we have begun systematically ignoring our surroundings without quite realizing that our alertness has faltered; we have damaged natural systems; we have put our own safety and health in peril. (#16)

The sense of "nativeness" of belonging to a place, to begin with, is critical and necessary. It's a matter of how you relate to the land. Some people act as though they were going to make a fast buck and move on. That's an invaders mentality. Some people are beginning to try to understand where they are, and what it would mean to live carefully and wisely, delicately in a place, in such a way that you can live there adequately and comfortably. Also, your children and grandchildren and generations a thousand years in the future will still be able to live there. That's thinking as though you were a native. Thinking in terms of the whole fabric of living and life. (#17)

As is clearly stated in these quotes, a carefully designed place will provide an environment within which one can regain a sense of self. The work one does in the recycling center will support man's role as a steward of the planet, of the land.

A familiar form which man uses when bringing definition to the land is that of the garden. There exists a long history and tradition of garden landscapes and I have chosen this prototype to serve as inspiration to bring definition to the site.

Louis Kahn states:

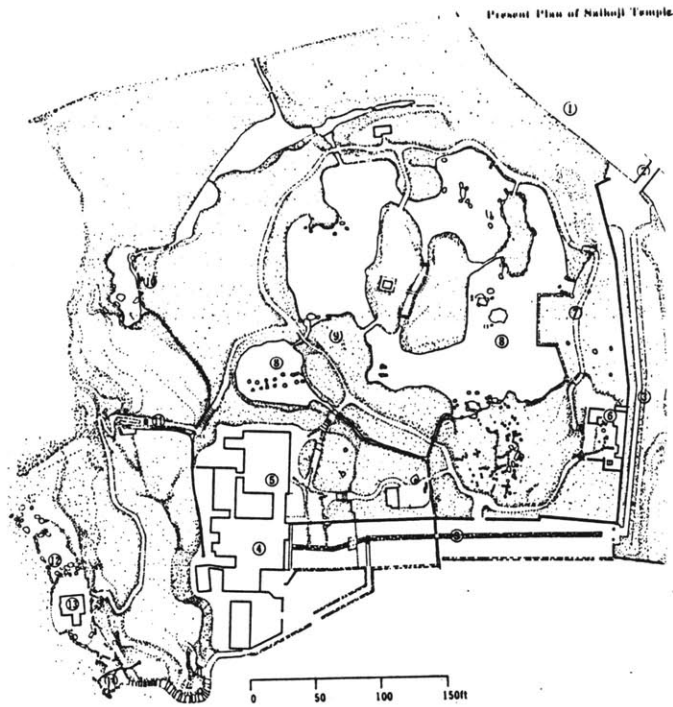
There is a distinction between nature's laws and our rules. We work by rules, but we employ nature's laws to make something. The rule is made to be changed, but nature cannot change its laws. If it did, there would be no Order whatsoever. There would be what we think is chaos... Any rule you have is really there on trial. The greatest moment of a rule is change: when that rule comes to a higher level of realization, that leads to a new rule. (#18)

Since a garden model is to be adopted, close attention must be paid to the rules which underpin the particular type of garden chosen. I chose the garden of Japan as my guide in this thesis. Traditionally, in Japanese gardens, a theme is developed which recognizes and embraces the different qualities and aspirations of man. These qualities are supported by the garden's form. The Japanese philosophy, which places man and nature together in a dynamic and supportive relationship, will provide a foundation for the intentions of this thesis. That is: the creation of a place which will nurture people as they reunite with the earth through the act of recycling.

The following excerpts (and source material reproduced in Appendix G) from The Japanese Garden will help explain this choice:

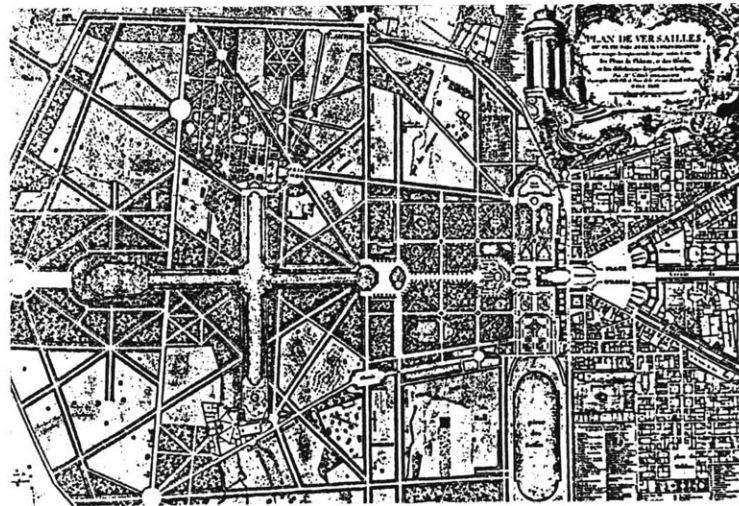
In the Oriental garden it is nature and not the gardener which does the creating. The line of a stone, the mass of a tree, the contour of a hillock - all of these things are observed and worked into a pattern which the garden architect has perceived. A pattern which, because it is natural, is unique. Since he is always inside his garden, the viewer is always surprised by a new vista, an unexpected view - he arranges for it. His natural garden will change with the seasons, just as those who see the garden will change with the years.

(#19)



Plan of Saihoji Temple, Japan. (b)

In the Occidental garden, trees are ordered, paths are straightened, and a visible form is imposed. A person always knows where he is in such a place. He sees it from above - as it were. He will never become lost while taking a stroll because he, the lord of creation, has himself made his garden. Like his deity, he has crafted order from chaos and he feels himself somewhat god-like. (#20)



Plan of Versailles, France. (c)

Both kinds of gardens represent a kind of ideal. The Western garden represents ambition attained, nature subdued. It is an illustration of the humanist ideal: man is the measure of all things. (#21)

The Eastern garden and its assumptions are quite different. Man finally and firmly becomes a part of nature itself. There is no assumption that there is something better than nature. Nature is itself and that is enough. The man who can accept nature can also accept himself. (#22)

The oriental garden welcomes man into nature, to grow, learn and change with life's passing. The occidental forces nature to conform to Cartesian points, stripping her of her subtlety, while imposing man's imprint.

The Japanese garden supports a reverence for nature and a physical and spiritual reconnection with the earth, because it allows the visitor to 'accept nature and accept himself'.

People will come to this 'garden' to engage in the work of recycling. The garden will welcome such activity and generously support the act of recycling and the spirit which lies behind it.

To build on this notion of our active participation, through work, in the process of recycling and resource recovery, we must make the individual effort to sort our household trash and transport it to the site.

By becoming physically involved in the process, we actively participate in the responsibility we have toward the community, while making a commitment to our neighborhoods and by extension to the earth.

One of the key problems in American society is people's lack of commitment to any given place. Neighborhoods are allowed to deteriorate, landscapes are allowed to be strip-mined, because there is nobody who will live there and take responsibility; they'll just move on. The reconstruction of a people and of a life in the United States depends in part on people, neighborhood by neighborhood, deciding to stick it out and make it work where they are, rather than flee.
(#23)

In bringing our sorted trash to the 'garden site' and completing our work there by placing it in the proper container, a connection between work and the garden is made. This joining of activity with place will transform the site into a working environment or working landscape.

Tony Hiss describes working landscapes and the need for them in the following quote :

The reinvolvement of all modern Americans in the patterns of kinship, partnership and neighborly and intellectual connections which operate in three basic elemental environments: natural landscapes, working landscapes, and cities... depletion in any one of these means a corresponding depletion in man's life. When all three of the elemental environments are readily available to people they form the terrestrial basis of "a fundamental world of man's needs as a cultured being" - a basis that makes possible a kind of collective forethought, or anticipation of the future which is otherwise not ordinarily available. (#24)

Working landscapes, in the form of resource recovery centers, provide one of the three 'elemental environments' which Hiss mentions. Their establishment will help fill a void which exists in many of our lives, since so few of us works outdoors with the land. Rather, as John Dewey states, we generally find ourselves in the following predicament::

It is ... the history of ... industrial development through which so much of production has become a form of postponed living and so much of consumption a superimposed enjoyment of the fruits of the labors of others. (#25)

Certainly the accomplishments of the Industrial era can not be denied, but humans need to regain a sense of self within the benefits offered by the times and return their energies to the earth through care and respect for the resources which the earth provides.

It is through the establishment and use of "working landscapes" in communities across America that people will be reconnected to each other and to the earth and by way of this association, will become responsible stewards of the planet and her resources.

The joining of work with landscape is a profound idea. Since a potential consequence of performing work is to regain one's sense of self and to do so in the landscape fosters a vital sense of connection with the environment.

If there is one thing that's unhealthy in America, it's that it is a whole civilization trying to get out of work - the young especially get caught in that. There is a triple alienation when you try to avoid work : first, you're trying to get outside energy sources/resources to do it for you; second, you no longer know what your own body can do, where your food or water come from; third you lose the capacity to discover the unity of mind and body via your work. (#26)

Part of being a responsible adult is having a sense of responsibility for the environment. And you can only care for something you've grown to feel a part of ... People are created both as wholes and as parts; that is, they have to learn how to function both as separate individuals and as participants in larger patterns that include harmonious relations with other people and with all of life. It is only outdoors that a person can learn empathy with the rest of creation. (#27)

In addition to nurturing a connection to the environment, development of "working landscapes" in the form of resource recovery centers can also help reknit communities. They can offer an opportunity for a sense of community to reemerge, something which is profoundly lacking in our fast paced society.

Three different forms of connectedness - the sense of kinship with all life; the sense of partnership with working landscapes; and the sense of community and companionability which is traditionally fostered by village and urban neighborhoods - can be maintained in, or if necessary, be brought back to even the most densely settled districts - both old and new. (#28)

A new approach to community development is in the making - one that asks people to think about the long term needs of a place and all its residents.... We are learning how to reinvest in areas so that they will be more valuable to the next generation than they are to ours....Most of what we have been doing is just throwaway stuff- it can't be sustained. I think that we can now show that stewardship springs from connectedness . (#29)

To serve mankind's interests well and to make the greatest possible development of the creative potential available does not require either numbers of human beings or complex societies. The exploration of consciousness itself and the unfolding recognition of the same principles which are at work in our own minds as being the exact principles that are operating around us is the most beautiful of possible human experiences and something of that order is what the development of human society should serve ... because that teaches you that you can not act simply for yourself that you are not alone, it teaches you the sanctity of life. (#30)

It is clear that by participating in the act of recycling in our homes and at the proposed resource recovery center(s), there is great potential for change both in our individual lives and in our relationship with others and with the planet.

This change will be welcomed by some and feared by others.

As we face this need for change, we must realize that it comes out of a clear and present danger and is not merely change for the sake of change. In fact, the lives of future generations may depend on the actions that we initiate today.

It is my hope that this thesis will make a positive contribution to the work of communities as they examine the choices before them and strive to create a vision for the future.

In conclusion, as Wendell Berry asserts:

We are required, obviously, to take proper care of this earth that is a gift to us. But this cannot be done merely by law and imposed restraints. In order to become capable of the necessary caretaking, we must think again of all the issues of work and of livelihood. For the earth is not being destroyed by the industrialists alone; it is being destroyed by every consumer. We must renew our families and our neighborhoods. We must remake the local economies of household and community. Only by living locally, as frugally and self-sufficiently as possible and on a small scale, can we hope to restore generosity to the human economy. (#31)

III. The Site

The site I have chosen for my design is in Belmont, Massachusetts. It is a 15 acre parcel located on Concord Avenue, surrounded on three sides by conservation land. For many years the town has used it as a sanitary landfill. An old incinerator building remains within its borders.

Today, January 15, 1990, the town plan calls for the 'dump's closure once the man-made hill of earth, concrete, and asphalt reaches a height of 213 feet. For recycling, there currently exist two bins: one for paper and one for glass and a designated area for aluminum. An active leaf composting area is in use towards the back edge of the property.

Because of the importance of enabling users to feel a connection to this site, I located the activity of recycling to the back of the site. One must pass through a landscape on the way to and from the recycling area. (As a result the leaf windrows were moved to the front of the site.) The intention here is that by moving through a landscape on the way to recycling, one's pace of life will slow down, even if only momentarily, and in so doing, a sense of reconnection to the land will be allowed to emerge within oneself. The leaf windrows, through which you exit, serve as a visual reminder of the concepts of transformation and renewal, which are inherent in the recycling process.

One of the steps in designing this site plan was to create a series of spaces. By approaching the site in this way, different intentions and experiences could be explored and carried out in each space. Once the spaces were established, their territories set, the boundaries could then be eroded and two areas could be subtly merged.

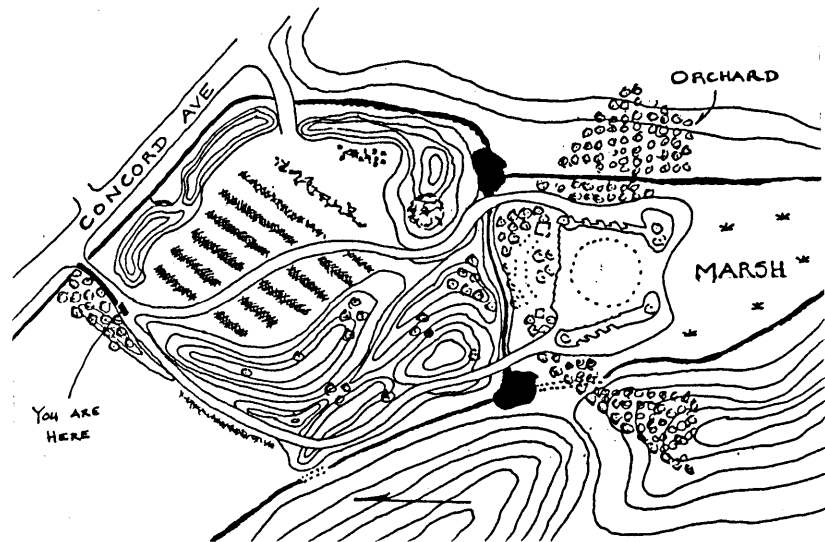
The following narrative is intended to explain my intentions in designing the different areas of the site. Please notice in the accompanying drawings a small black dot on the road which indicates where we are as we move through the site.

The entrance sequence to the site is intended to provide a place for people to 'break' from the busy world.

The road moves over gentle inclines and declines,

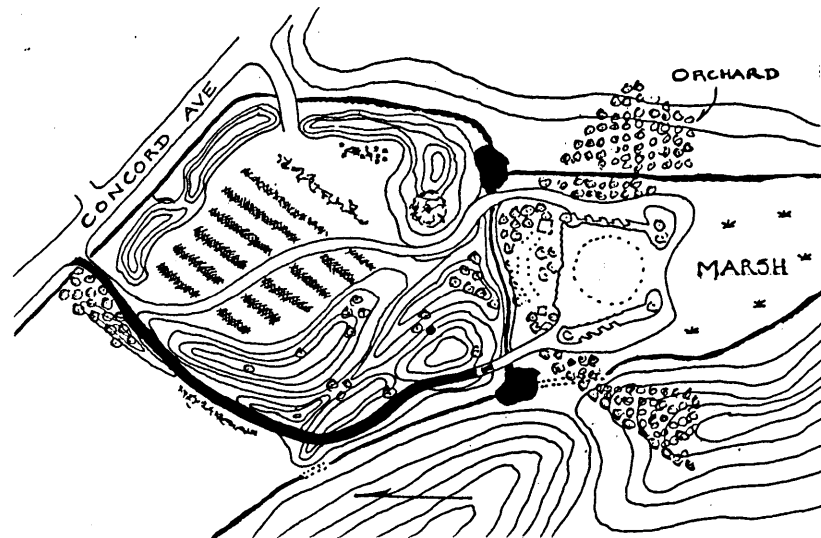
the landscape is beautiful, soft, and healing. It provides the groundwork for reconnection with the land. Glimpses of materials in states of change, introduce the visitor to the process of transformation.

As you enter the site, the right side of the road is flanked by seventeen trees. It takes seventeen trees to create one ton of paper. To the left one glimpses piles of composting leaves which lie in a state of decomposition. You proceed down the road to the right on the way to the recycling area. On the left a series of hills undulate and intermingle, here and there a clump of trees appear. On the right trees harvested from around the town lie in various states: from trunk length stems, to split firewood, to piles of wood chips. These materials are free for the taking.



Just behind, a stream runs, flanked by a hill. The hill is covered in spring and summer by wildflowers and in fall and winter, evergreen bushes are revealed amongst the brown grasses. And beyond all of this is a stand of trees which defines the edge and frames the site to the west.

Moving ahead, the road narrows, a wooden bridge is crossed, marked on left and right by "split face" granite posts, pond on right, ribbon of water on left.



A pond is the landscape's most beautiful and expressive feature. It is the earth's eye; looking into which the beholder measures the depth of his own nature. The fluviatile trees next the shore are the slender eyelashes which fringe it, and the wooded hills and cliffs around are its overhanging brow. (#32)

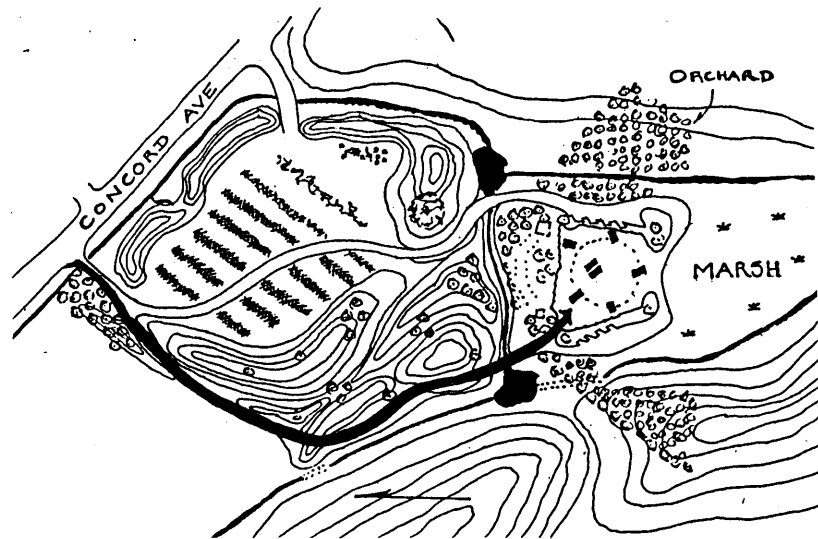
This point, marked by water, is a transition from the 'reflective' portion of the site to the 'participatory' resource recovery area.

To your left the land smooths out. An apple orchard will be grown here. Its presence is a reminder to us of our dependence on nature for food and of the sustaining link between earth, air, fire and water. The orchard, laid out on a grid, lies in random disorder or snaps to attention depending on the position of the car.

The left fork in the road brings cars into a large collective space for recycling, the right fork leads down to the area where large trucks can service the recycling bins.

The common area is a large space: 160 - 180 feet across. It is defined to the north by a collection of buildings and to the west and east by the recycling bin areas. Paper products are recycled on the west, plastics, metals, and glass on the east. The surface of the parking area is constructed of gridded concrete pavers which allow grass to grow, softening and cooling the space, and creating a visual link between the common area and the marsh beyond.

This 'common room' is the place where the work of separation of materials occurs and where people can come together and interact with one another.



They can observe each other at the work of recycling, and develop a renewed sense of community spirit.

The 'take it-or-leave it' shed buildings provide shelter for objects which people want to discard but which still have useful life left, items of clothing, pots, pans, toasters, etc. The old-fashioned notion of sharing goods with one's neighbors is restored, and roaming through these sheds provides a chance to witness the opportunity of renewal found in even the most basic object.

To find a built environment which has evidence of loss and restitution, of decay and repair of people, clothes, tools, ... is a reinforcing one, for it is in match with our reality, not denied.

As infants we understood ourselves first to be continuous with all about us and then slowly to see that we are not so continuous, and finally to find we are only one with ourselves. But the connections of infancy remain through life and we continue to see every object as endowed with life, and in so doing we seek to find our own parts in these objects. (#33)

The site custodian's office is at one end of the chain of buildings. The center for education and learning at the other. The shed buildings lie in between. Visitors are welcome to visit here over a cup of coffee while looking over the available items.

Each of these buildings should be built of materials which will weather well and gain in a richness of patina over time. Natural materials such as wood, granite, brick, tin, and copper, are among those that come to mind.

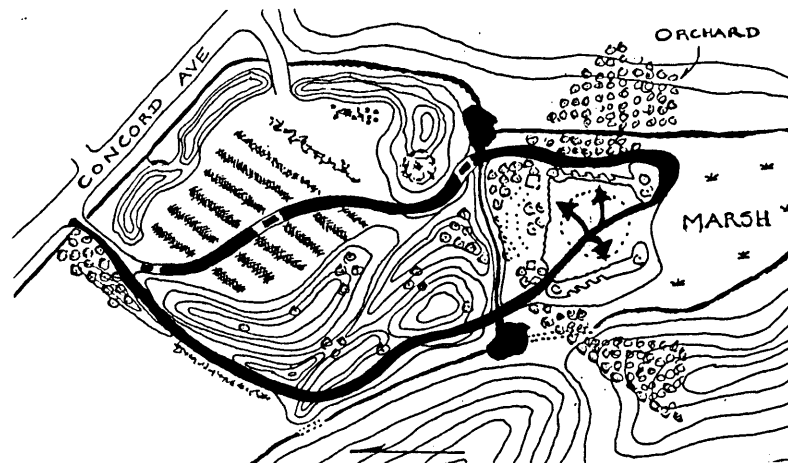
The recycling bin areas are lined with large deciduous trees. The trunks will grow tall and the crown of the tree will develop above the heads of people. They are columns, ordered and stately, marking and holding the edge.

The center of the common space is circumscribed by a circle. The area inside this circle is slightly crowned which differentiates it from the surrounding space. This is done to indicate that entering into it is special. Cars and people are welcome to drive and gather here.

From this room we look south over the marsh, which is an inverted V, we stand at its open end, and can see its vanishing point. A view of implied infinity.

This is the terminus of our journey into the site. We now begin our journey out, traversing the land, preparing to reenter the 'real' world.

You cross the stream and a large hill contains you on the right. Growing on this hill is a large white oak, a tree which can live for

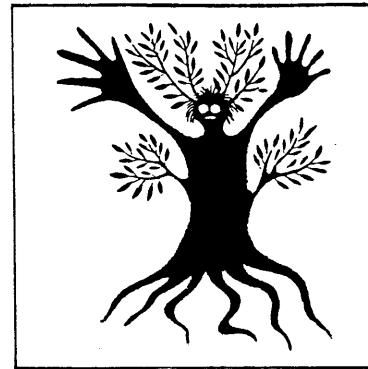


200 - 400 years. The view to the left is of the gently rolling hills.

For humankind the trees - their roots in the ground , their heads reaching into the sky , have seemed always to bind together the universe.

Almost all mythologies look to the Earth as Mother, bring forth and nursing life, and to the Sky with its sun as Father , the fructifying principle; Life emerges from the coupling of such deities of earth and sky. And as it is so frequently true, the myths fore-shadow our present science. We know now that all life on Earth runs ultimately on sunlight, working through the intermediation of plants.

Using the energy of sunlight, plants react carbon dioxide from the air with water from the ground to form sugars and the by-product oxygen, which is returned to the air. From the sugars, together with the salts from the ground, plants synthesize all the manifold stuff of life. (#34)



(d)

Your car now proceeds through the middle of the leaf windrow area. Rows of leaves flank the car on either side. Red and gold in the fall - a smokey deep umber in winter, their presence is a striking contrast to the view of the hill and trees behind them on the left and right. It is an active area with large front - end loaders working the piles of leaves frequently, speeding the decomposition process. Through the process of decomposition leaves are transformed into rich soil.

The prominent position the windrows are given in the site is intended to reinforce the notion of transformation and renewal. Since this process forms the base for all activities located at the site.

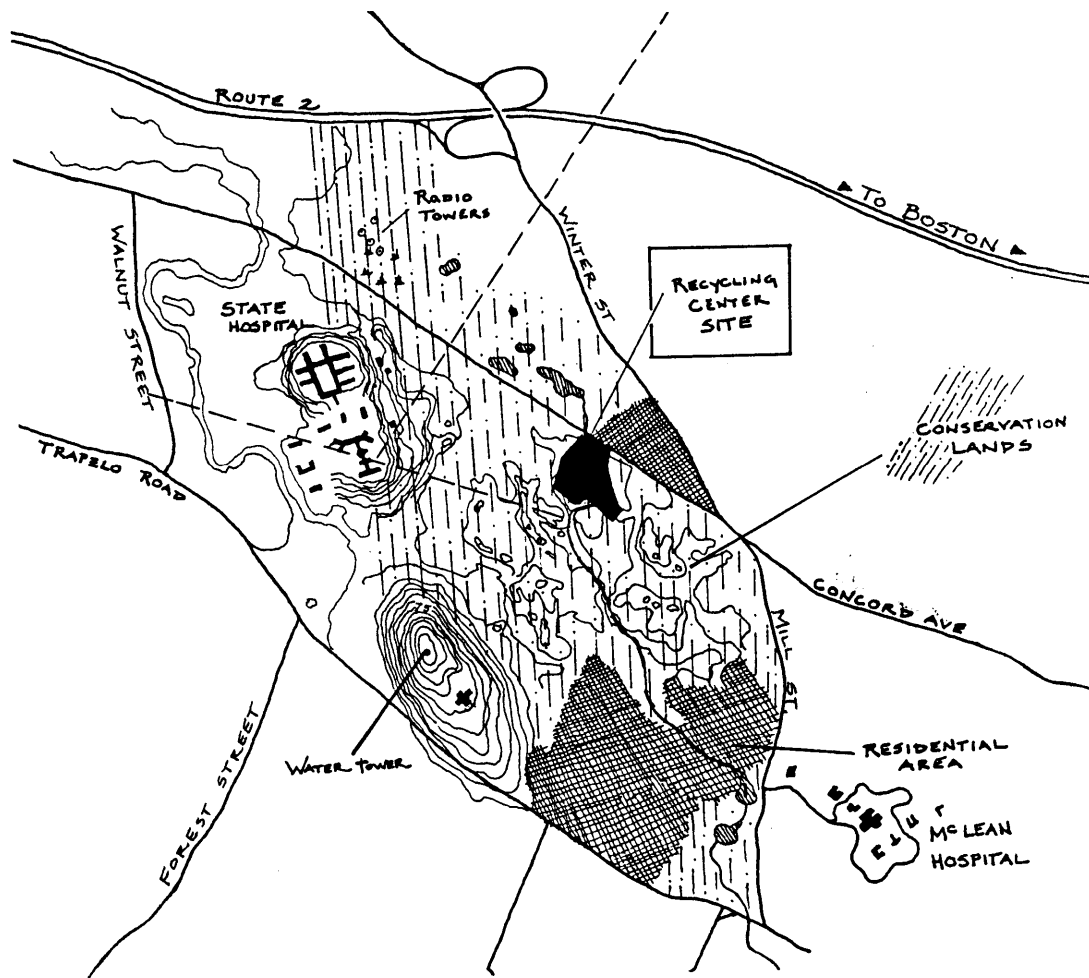
You now are back where you started. The cycle is complete.

It is hoped that over time, the experience of repeatedly visiting the site will provide sanctuary for those who make the trip. My hope too is that the changing seasons will be fully apparent and available and that people will come to feel a connection with this place, which will in turn engender a pattern of partnership and kinship with the community, the landscape and by extension the planet as a whole.



IV. Site Drawings and Models

Map Showing Location of Recycling Center and Environs



The site for resource recovery - recycling in Belmont, Massachusetts is shown above

Please note:

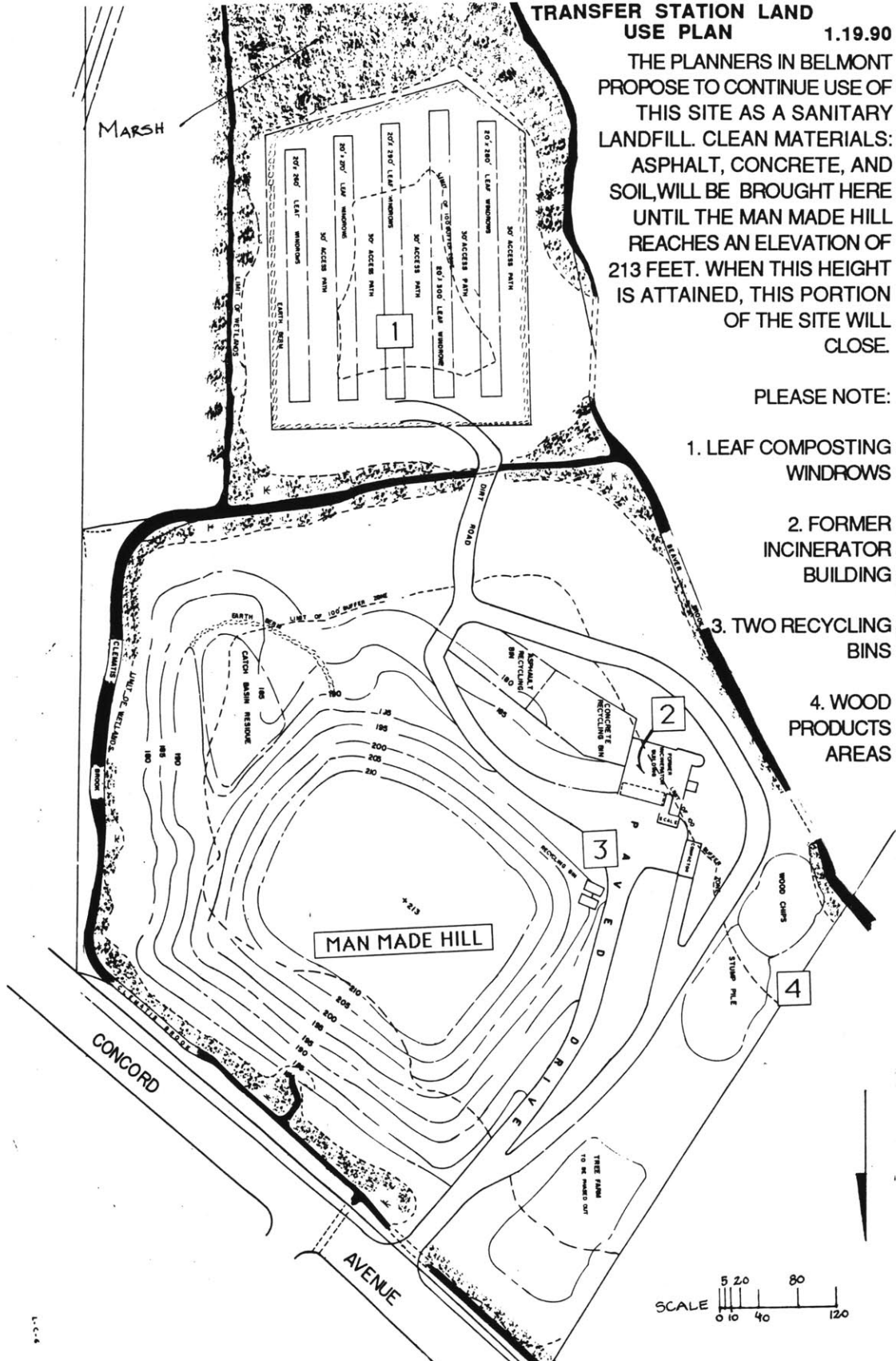
1. The close proximity to Route 2, a major traffic artery, linking the area to the interstate highway system, which will facilitate the distribution of recovered materials.
2. The fact that it is surrounded by conservation lands.
3. Its location off Concord Avenue, a busy street which originates further west of Belmont, crosses through Belmont Center, and terminates in Harvard Square. This position makes it easily accessible to a significant volume of traffic.

**TRANSFER STATION LAND
USE PLAN 1.19.90**

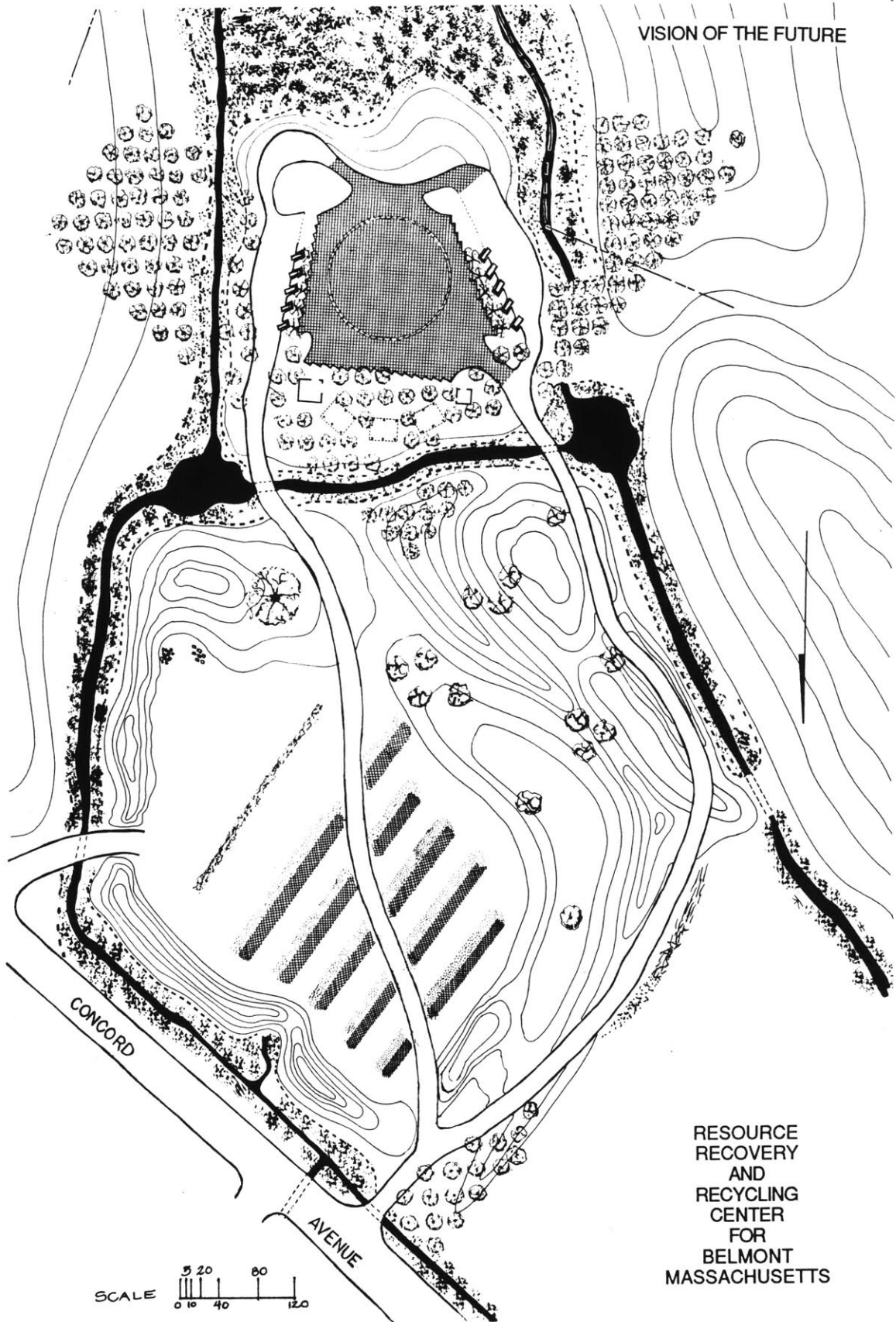
THE PLANNERS IN BELMONT PROPOSE TO CONTINUE USE OF THIS SITE AS A SANITARY LANDFILL. CLEAN MATERIALS: ASPHALT, CONCRETE, AND SOIL, WILL BE BROUGHT HERE UNTIL THE MAN MADE HILL REACHES AN ELEVATION OF 213 FEET. WHEN THIS HEIGHT IS ATTAINED, THIS PORTION OF THE SITE WILL CLOSE.

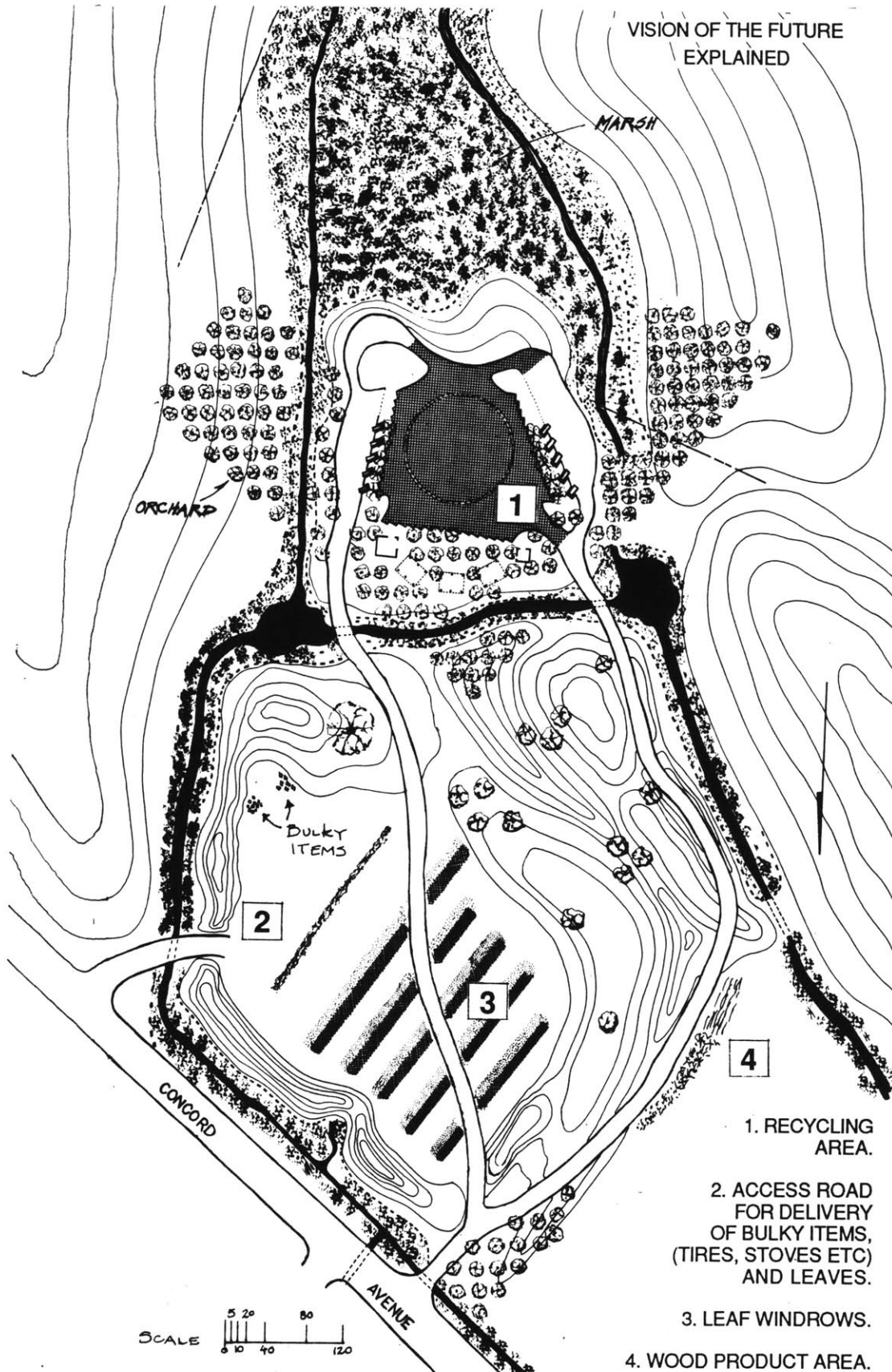
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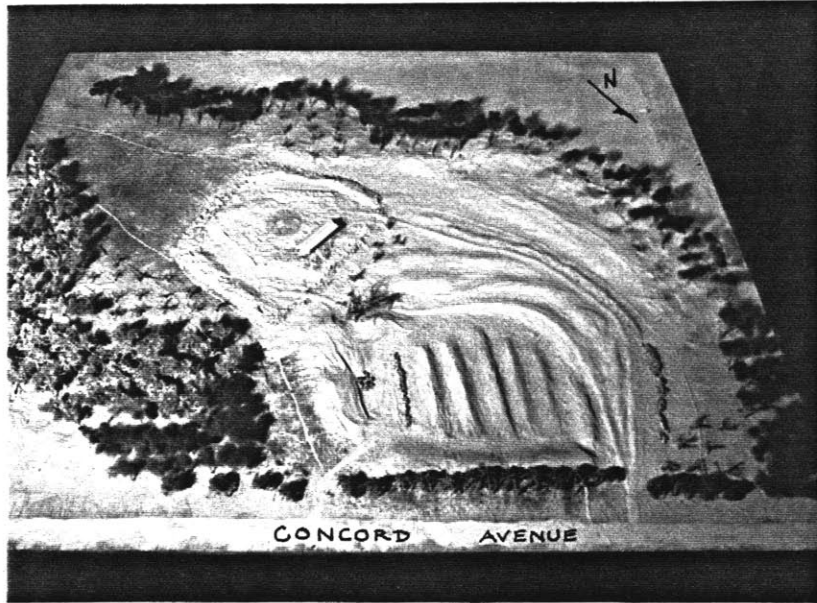
- 1. LEAF COMPOSTING WINDROWS
- 2. FORMER INCINERATOR BUILDING
- 3. TWO RECYCLING BINS
- 4. WOOD PRODUCTS AREAS



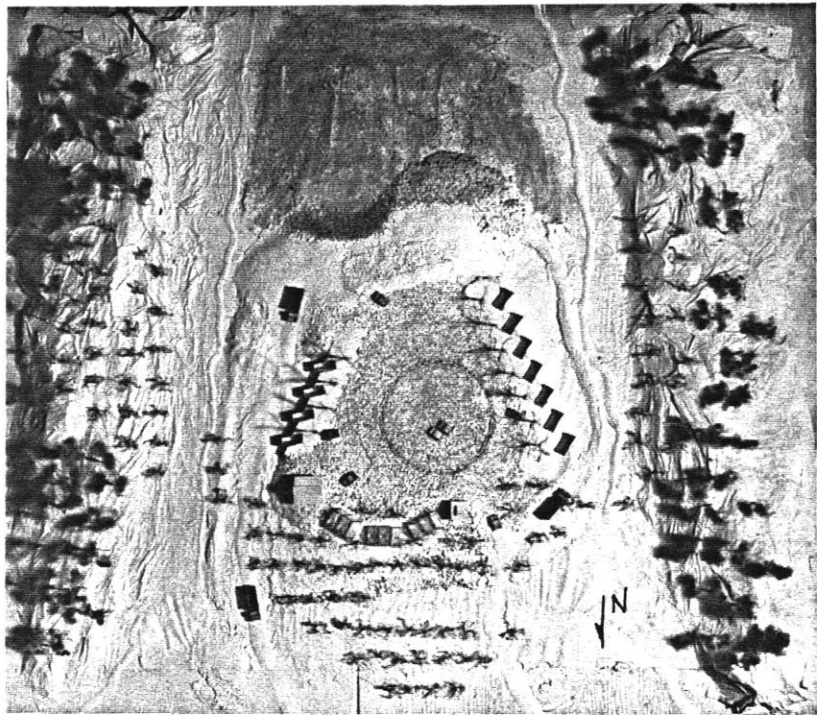
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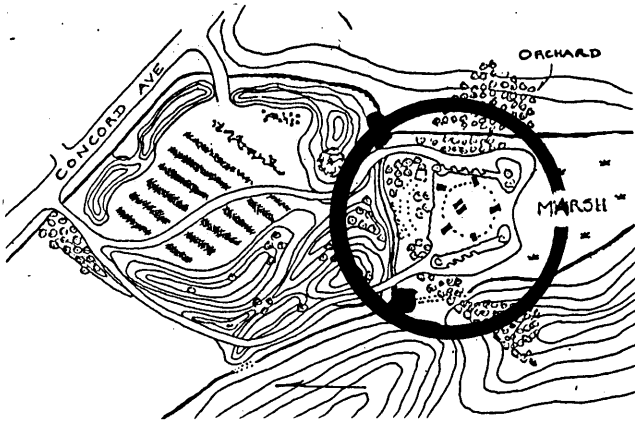




Site Model - Plan View

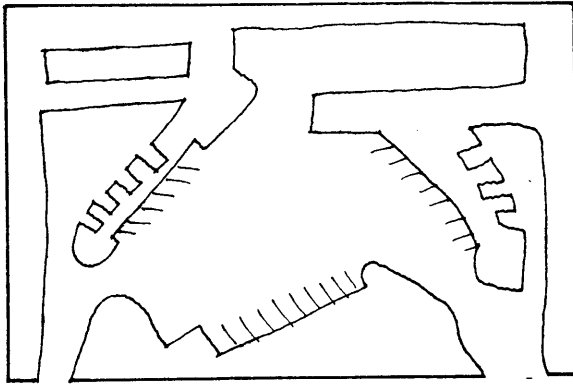


Recycling Area Model - Plan View

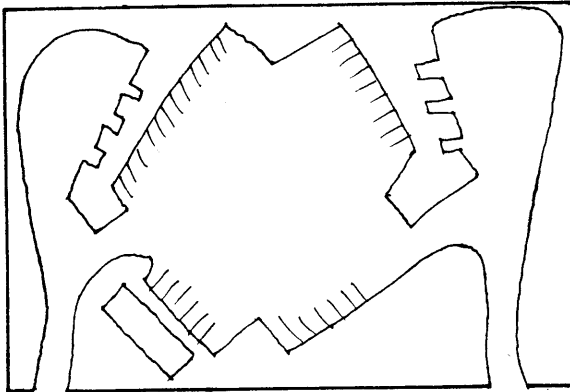


Design Explorations Recycling Area

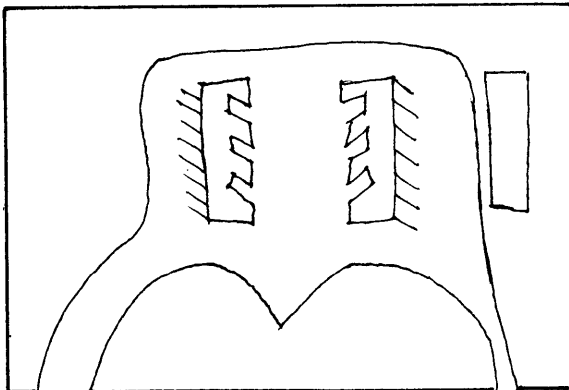
The recycling area is located at the rear of the site. It is bounded on three sides by wetlands. The road servicing the area is one way: You enter on the west - exit on the east. The following explorations led to a final design solution.



1. Recycling bin areas too cramped . Trucks will not have easy access. Too many dead ends. Beginnings of shared collective space in middle. Building a bit isolated on marsh edge .

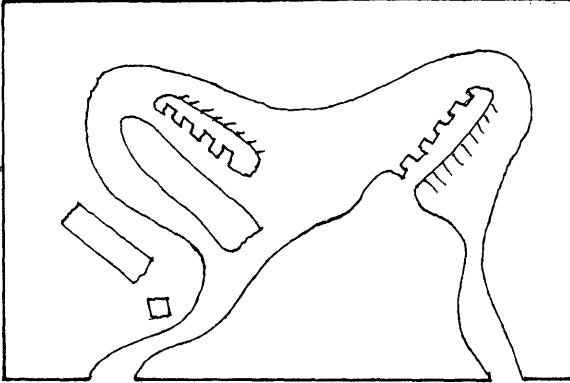


2. Bin areas made bigger but still dead ends. Building moved into the body of the site - no longer on marsh edge - forms an edge to the north . Good collective space .

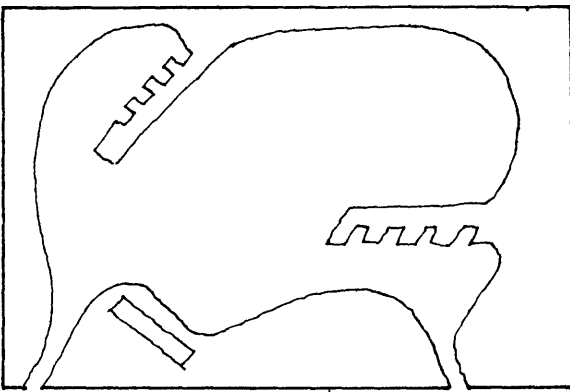


3. Here collective space filled with the activity of recycling - parking around the perimeter . An experiment - rejected .

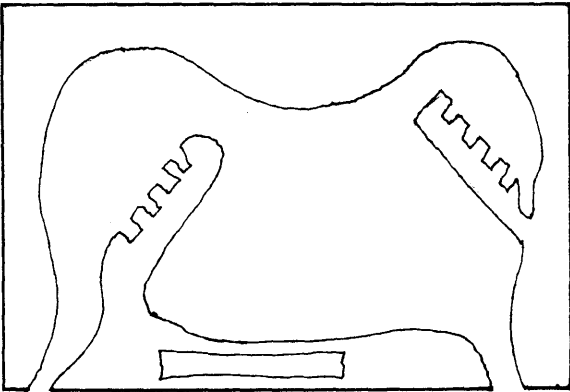
Design Explorations Recycling Area con't...



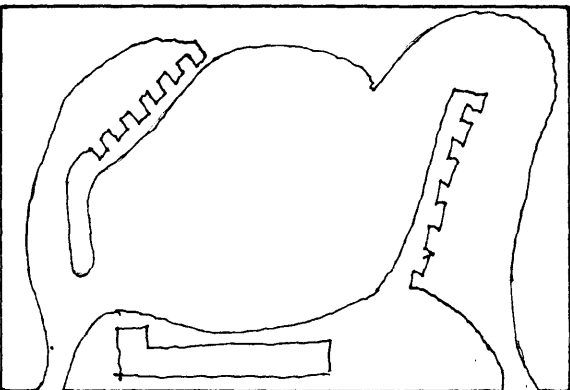
4 . Traffic flows around outer edge , but building isolated and building access difficult. Landscape takes up too much of the available space. Collective space gone...



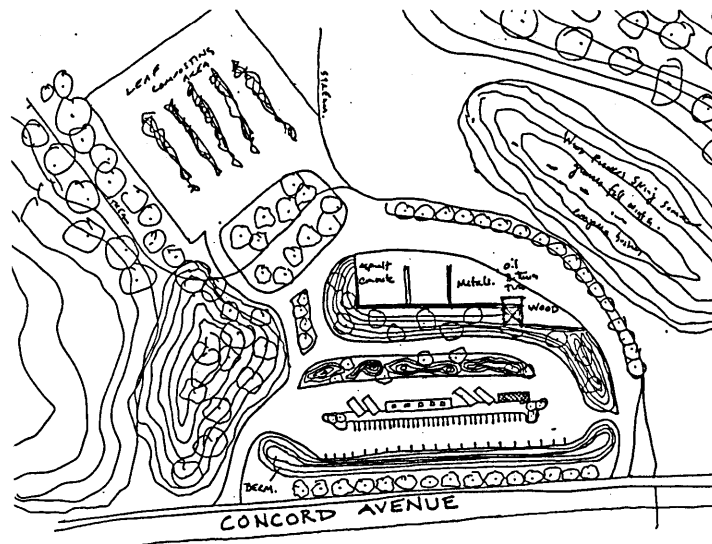
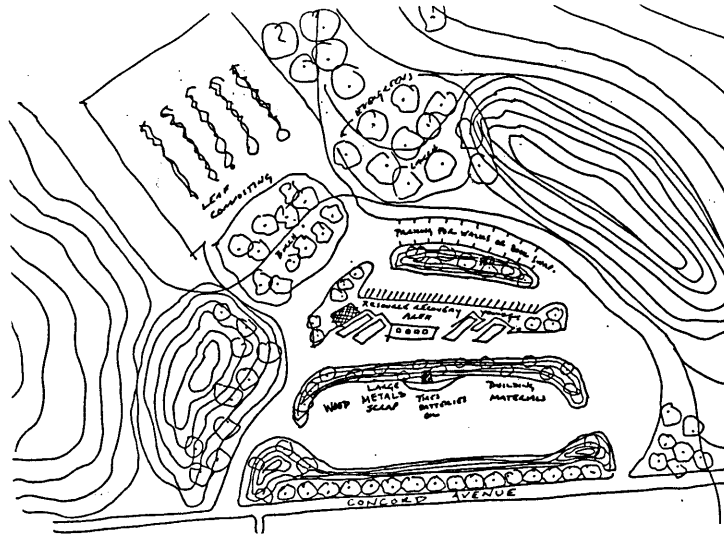
5. Collective space returns. Yet entrance given over to back side of bins- the trucking access edge. Dead ends still persist.



6. Building situated in good place. Bins on left hold the edge of the collective space and route traffic around edge. Bins on right still create dead ends.



7. Now bins and buildings work together to define a successful collective space. Small adjustments to be made allowing separate access for trucks and cars .



Model of Efficiency

These two drawings were made early in the semester. They are based on a model of efficiency: it is easy to quickly enter the site, drop materials, and exit. Here few modifications are made to the site from the way it exists today.

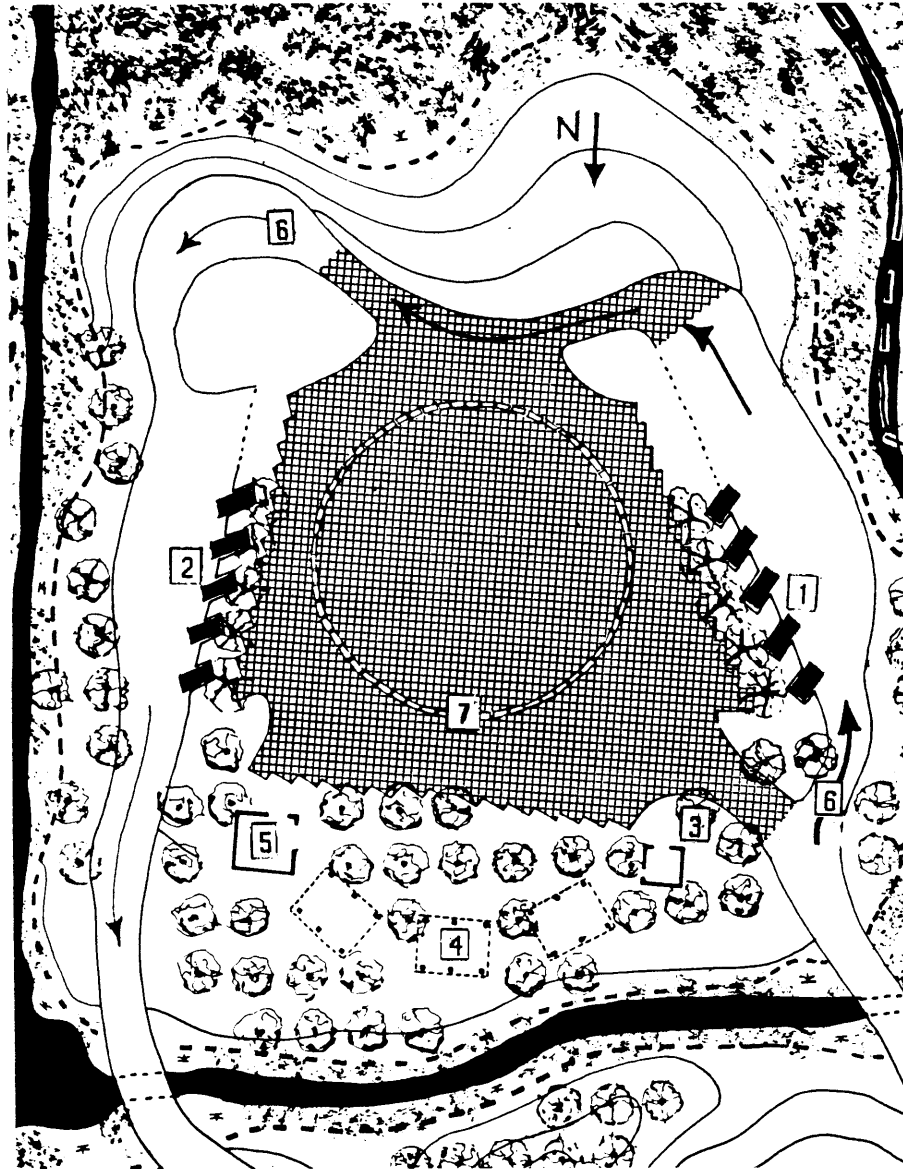
The author rejected this approach immediately. On the basis that a recycling center based solely on efficiency would not be able to convey a strong sense of place and support the notions of transformation and renewal discussed earlier in the thesis.

This solution is the result of the explorations shown on the preceding pages. It was selected for the following reasons:

1. It uses a one way traffic flow pattern which keeps truck traffic out of the central space .

2. The recycling areas and buildings surround and strongly define the collective space.

3. The view to the south is left open allowing visitors a full, unobstructed view of the marsh.



Final Solution For Recycling Area:

1. Bin Areas ... for the collection of:

Cardboard and corrugated paper
Newspaper
Milk cartons
Magazines, catalogues, Phone books, Misc Paper...
Brown bags

2. Bin Areas ... for the collection of:

Glass; clear, amber, green.
Aluminum foil, TV trays, etc.
Steel, tin, bi metal cans
Refundable cans and bottles
Polyester bottles; clear and green

3. Site Custodian's Office.

4. Shed Buildings.

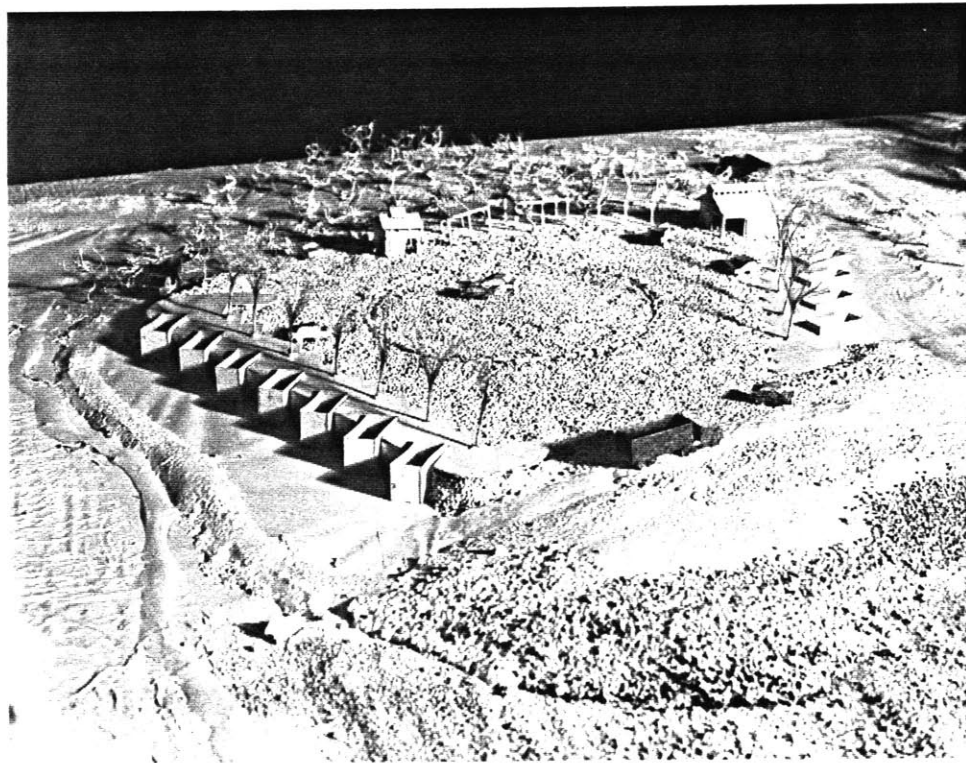
5. Information and Learning Center.

6. Perimeter Road. For truck and car use.

7. Common Space. Car, pedestrian, and bicycle use only.



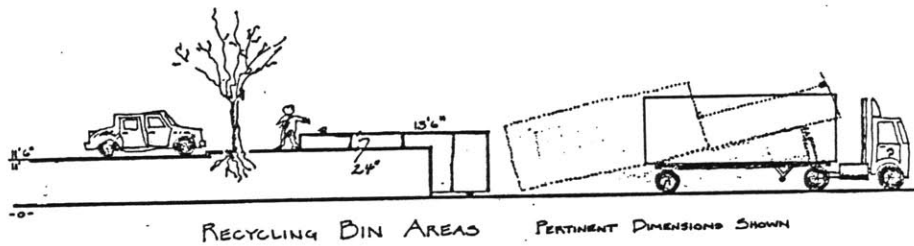
View of recycling area from the west.



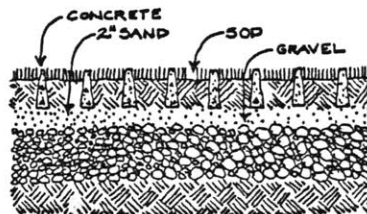
View of recycling area from the south.



View of recycling area from the east.



To facilitate operations at the recycling site, recyclers and truckers are separated by an 11 foot height differential. Bins are placed in the ground at a height which provides easy access for both parties.



Grid Pavers (section): - used to pave central common space and all car parking areas.

Site Buildings :

There are three building types planned for the site. (see following pages).

Each building should be of simple design and construction using materials which will age beautifully over time... granite, brick, wood, iron. All are oriented to the south to take advantage of the sun and are sheltered to the north by an earth berm. There will be little need for electric light - since each building has clerestory illumination and ample window and door openings.

In light of the current fiscal crises that many communities are experiencing, it is my hope that that structures such as these could be built with volunteer labor and even with donated materials (perhaps donated materials could be tax deductible).

Such a shared experience, a barn raising of sorts, would facilitate the process of establishing a sense of community and connection with the site.

Site Custodians Office (1)

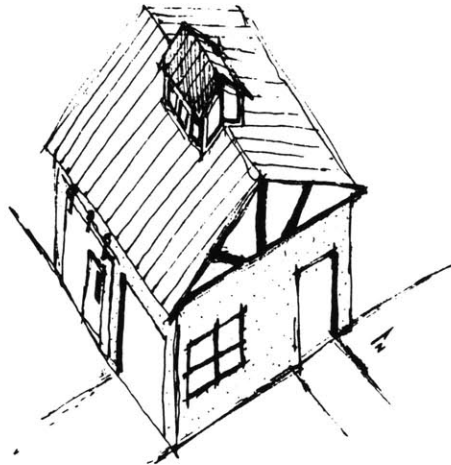
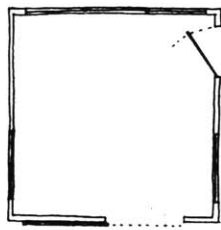
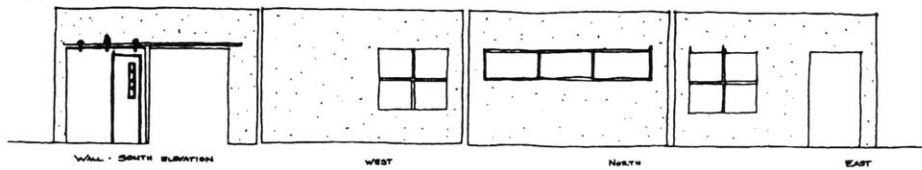
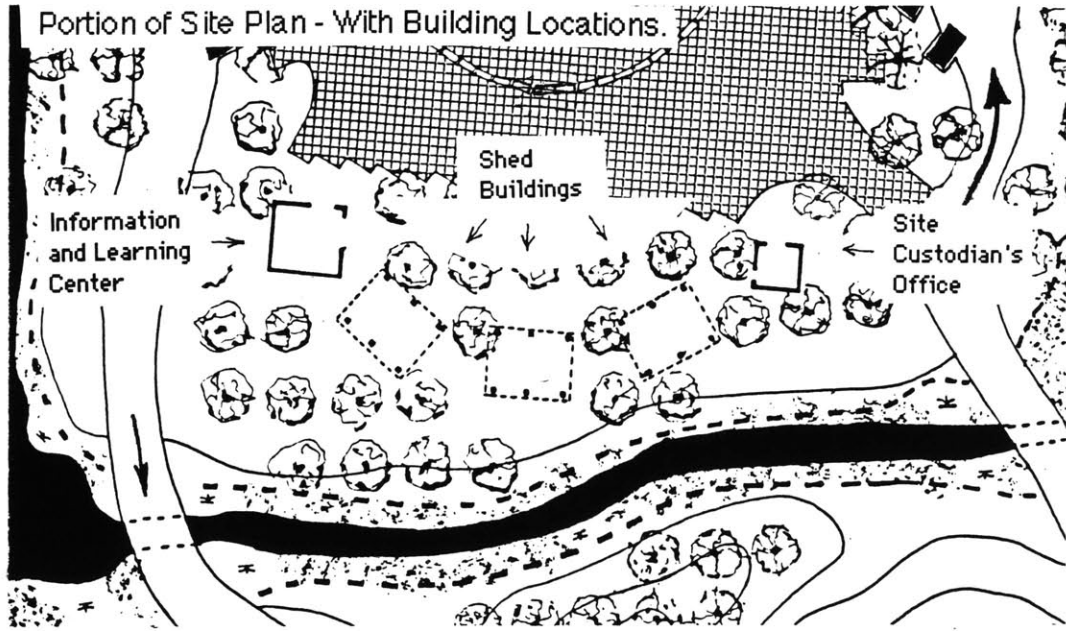
This building, as are all the buildings, is open, light filled, and airy. By its nature it is intended to challenge the pattern in which the 'dump' custodian sits in a chair at the rear of the site removed and uninvolved. Here the building is at the entrance to the site and anyone working here can be out on the grounds lending a helping hand.

Shed Buildings (3)

Three shed buildings provide shelter for the 'take it or leave it' areas. In the winter, north winds can be kept off by rolling down garage doors. These buildings are open air in character, no heating necessary.

Information and Learning Center (1)

The Information and Learning Center is a place where people of all ages can educate themselves about recycling and resource recovery. Local schools will be encouraged to have day trips here to learn about recycling and delight in the achievements their community is making in the area of recycling. A small resource library, bulletin boards, and an area for making presentations can be created here.

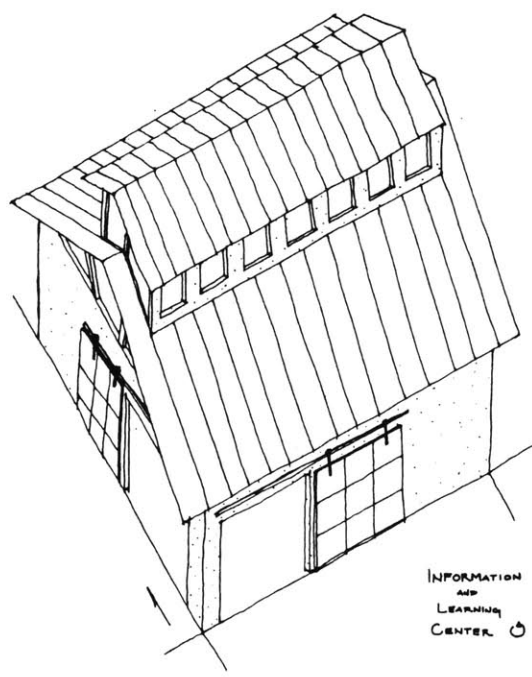
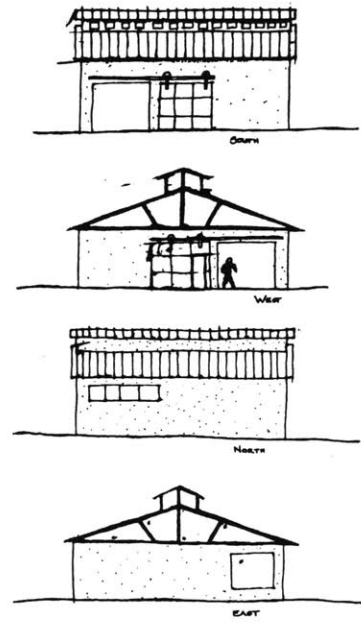
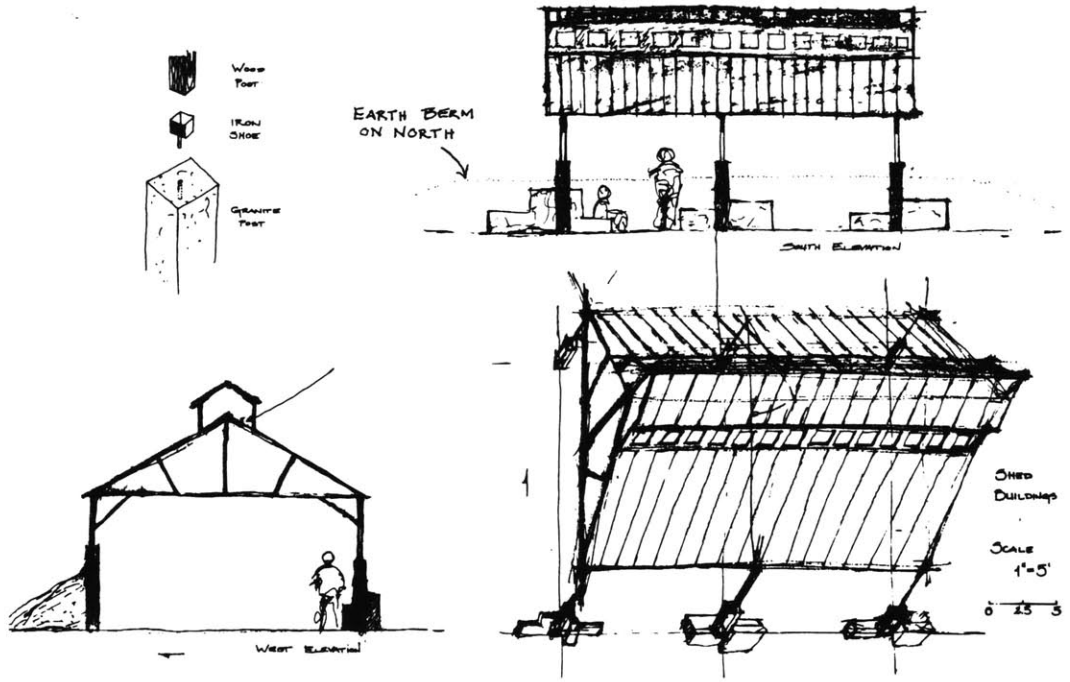


SITE
CUSTODIAN'S
OFFICE

SCALE:
1" = 5'
0 25 5

Site Custodian's Office.

Shed Buildings



Information and Learning Center.

V Methodology

During the development of this site plan two methods were used simultaneously: painting and modeling.

Painting

The use of a brush allows a freedom not possible with pen or pencil. I used them with a broad pallet of colors. The objective was to create paintings relating to the site which were intuitive in nature. Gesture paintings. The creation of these paintings established a foundation of impressions from which the author could draw inspiration for execution of the project. The colors were not used literally (i.e. green to indicate grass) but more for their feel, alone and in conjunction with other colors.

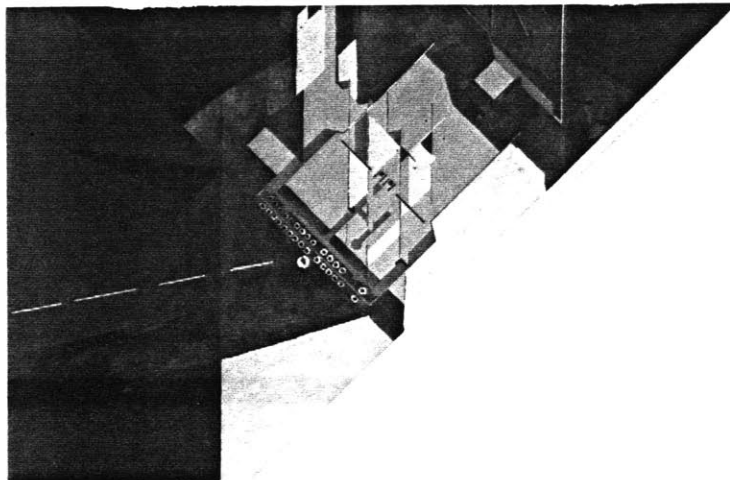
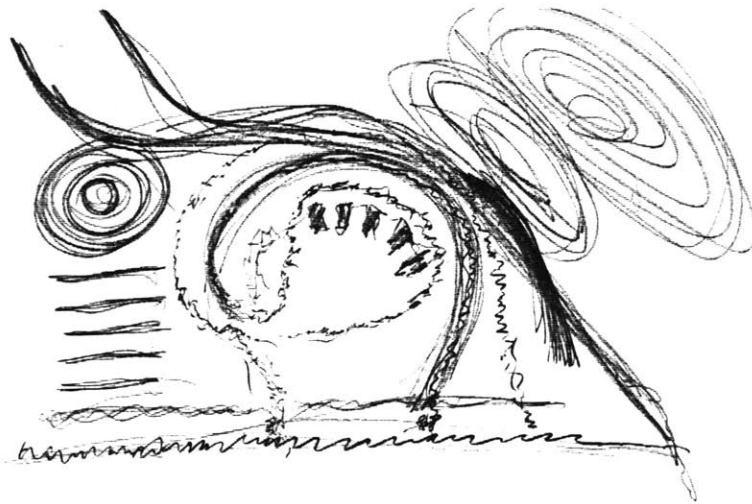
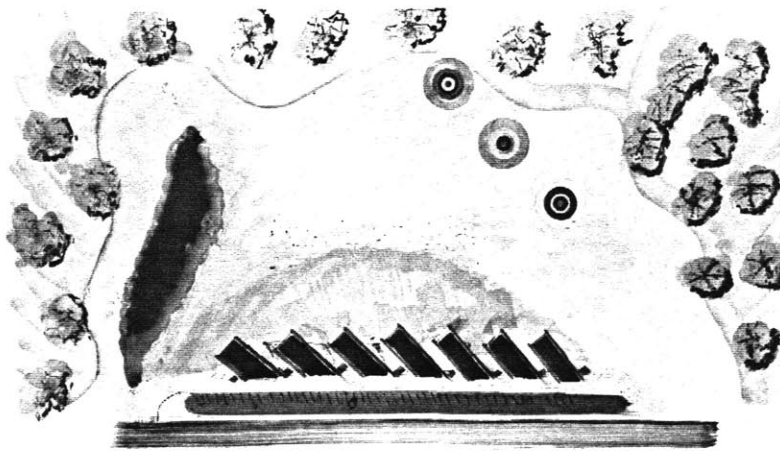
Modeling

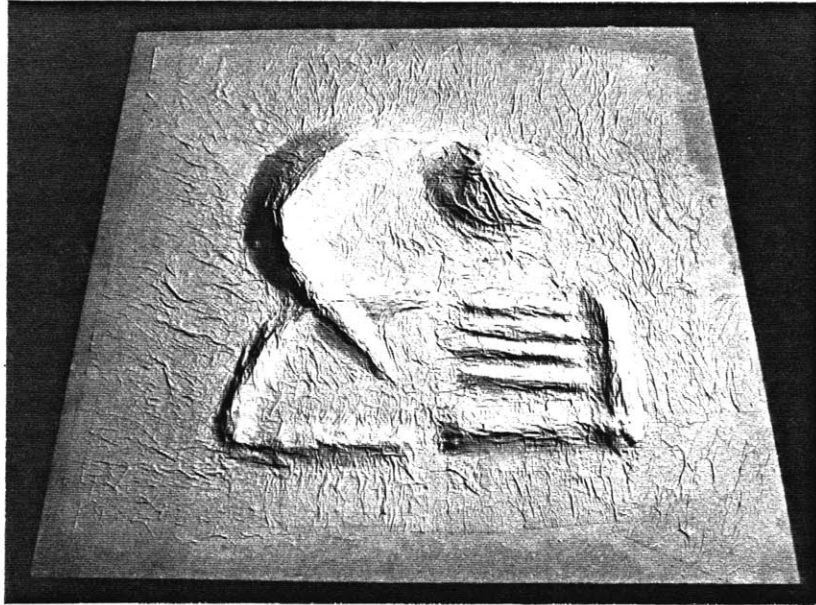
Models were used in two manners over the course of the project. As a way to:

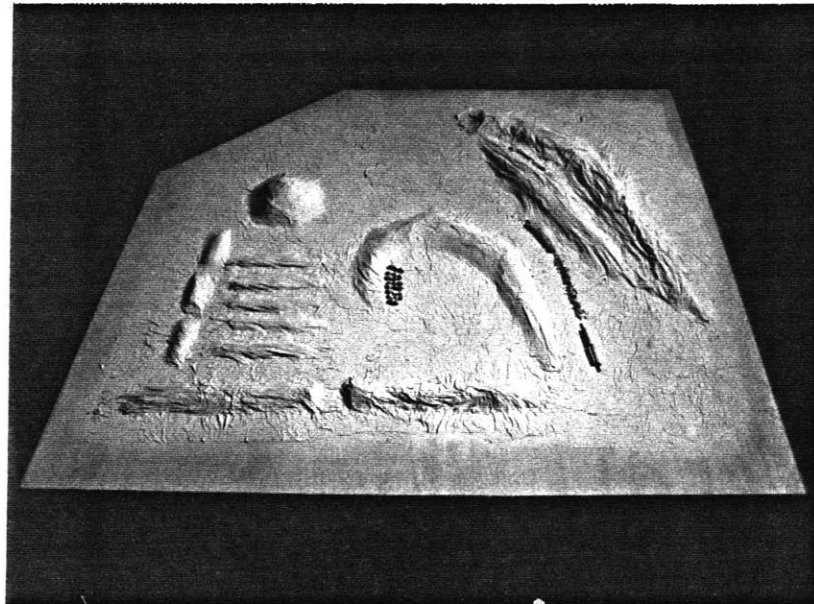
1. quickly explore and save ideas. The materials used in this process were sand, glue, and toilet paper. An amount of sand was poured on a plywood sheet and manipulated by hand and with a blade tool. When a satisfactory result was arrived at, the sand was covered with glue and then with squares of toilet paper, till the entire surface was covered. This was then wetted with a spray bottle. A brush dipped in a solution of glue and water was used to coax the toilet paper tightly against the sand. Once dry, the result was spray painted flat white.

2. show final design decisions three dimensionally.

The results of these methods are shown on the following pages.







Notes

1. O'Leary, Walsh, and Ham, "Managing Solid Waste," Scientific American, Vol 259 #6 (1988), p. 44.
2. Doiron and Stump, "The System Works," Greenpeace, Jan/Feb (1989), pp.16+17.
3. Goldoftas, Barbara, "Recycling Comes of Age." Technology Review,11/12 (1987), p.34.
4. Franklin Associates, Characteristics of Municipal Solid Wastes 1960-2000, Prepared for the U.S.Environmental Protection Agency,1988.
5. Seventh Generation, Catalogue of Recycled Products, 10 Farrell St, South Burlington, Vt, 05403, p.3.
6. Manning, Anita, "Bringing Conservation Home," USA Today, June 12, 1989.
7. Doiron, p.17.
8. Pollock, Cynthia, "Mining Urban Wastes: The Potential For Recycling," World Watch Paper #76, p.13
9. Manning.
10. Pollock, p.7.
11. Ibid., p. 6.
12. Ibid., p. 7.
13. O'Leary., p. 36.
15. John Dewey, Art as Experience, (New York: Minton, Balach, & Co, 1934), p.13.
16. Hiss, Tony, "Reflections: Encountering the Countryside," New Yorker Magazine, Part II, August 28,1989,p.46.
17. Snyder, Gary, The Real Work, (New York:A New Directions Book,1980), p. 87.
18. Lobell, John, Between Silence and Light. Spirit in the Architecture of Louis I Kahn, (Boulder: Shanbala, Publications, 1979), p. 26.
19. Ito, Iwamiya, Kamekura, The Japanese Garden, (New Haven and London: Yale University Press,1972) p. 138 & 139.
20. Ibid.
21. Ibid.
22. Ibid.
23. Snyder, p.117.
24. Hiss, p.46.
25. Dewey, p.27.
26. Snyder, p103.
27. Hiss, p.39.
28. Ibid.
29. Ibid, p.57
30. Snyder, p.29.
31. Berry, Wendell, What Are People For?, (Seattle, North Point Press, 1990)
32. Teale, Edwin, The Thoughts of Thoreau, (New York: Dodd, Mead&Co, 1962) p.221
33. Myer & Myer, Patterns of Association, (Cambridge, Massachusetts,1978), p.33
34. Wald, George, From the introduction to: Soul of a Tree, (Tokyo:Kodansha International,LTD,1981), p. xv.

Images

- a. Erdoes, Richard and Ortiz, Alfonso, American Indian Myths and Legends, (New York; Pantheon Books, 1984) p.91.
- b. Ito, p.162.
- c. Jellicoe, Susan and Geoffrey, The Landscape of Man, (New York: Thames and Hudson, 1987), p.187
- d. Erdoes, p. 22

Bibliography

Berry, Wendell. What Are People For? Seattle : North Point Press., 1990.

Brown, Patricia. "Ingenuity Is Creating A Home For Waste." The New York Times, July 27, 1989.

Bye, A.E. Art Into Landscape Landscape Into Art. Mesa, Arizona : PDA Publishers Corporation., 1988.

Clendinen, Dudley. "About Boston; A Garbage Dump That Is A Town Showpiece." The New York Times, August 2, 1985.

Coakley, Michael. "In Wellesley, People Wouldn't Dream Of Trashing The Dump." Chicago Tribune, June 6, 1986.

Dewey, John. Art As Experience. New York : Minton, Balch & Company., 1934.

Doiron, Kathy and Stump, Ken. "The System Works." Greenpeace, January-February 1989.

Erdoes, Richard and Ortiz, Alfonzo. American Indian Myths and Legends. New York: Pantheon Books., 1984.

Freund, Thacher. "The Trashing of New England." New England Monthly Magazine, January, 1989.

Goldoftas, Barbara. "Recycling : Coming of Age." Technology Review. November - December, 1987.

Ham, Robert., O'Leary, Philip., and Walsh, Patrick. "Managing Solid Waste". Scientific American, December 1988, Vol. 259 Num. 6.

Hiss, Tony. "Reflections - Encountering the Countryside - Part 1." New Yorker Magazine, August 21, 1989.

Hiss, Tony. " Reflections - Encountering the Countryside - Part 2. " New Yorker Magazine, August 28, 1989.

Ito, Teiji , Iwamia, Takeji , and Kamekura, Yusaku. The Japanese Garden. New Haven and London : Yale University Press ., 1972.

Jellicoe, Geoffrey and Susan. The Landscape of Man. London, Thames and Hudson, LTD., 1987.

Bibliography continued...

Kleiman, Dena. " Recycling at Home : A Daily Chore Becomes a Cause." The New York Times, July 26, 1989.

Levin, Michael. "The Trash Mess Won't Be Easily Disposed Of." The Wall Street Journal, December 15, 1988.

Lobell, John. Between Silence and Light. Spirit in the Architecture of Louis I. Kahn. Boulder, Shambala Publications, Inc., 1979.

Manning, Anita. " Bringing Conservation Home. " USA Today, June 12, 1989.

McDermott, Jeanne. "Does Recycling Pay ?" Technology Review, November, 1989.

McKibben, Bill. "Reflections - The End of Nature." New Yorker Magazine, September 11, 1989.

Merwin, W.S. The Miner's Pale Children. New York : Atheneum., 1981.

Myer, John. and Myer, Margaret. Patterns of Association. Cambridge, Massachusetts., 1978.

Nakashima , George. Soul of a Tree. Tokyo , New York , San Francisco : Kodansha International LTD., 1981.

Pollock, Cynthia. "Mining Urban Wastes : The Potential For Recycling." World Watch Paper 76.

Poore, Patricia. " Printing Garbage On Recycled." Garbage Magazine. September/October, 1989.

Schaafsma, Polly. Indian Rock Art of the Southwest. Albuquerque : University of New Mexico Press., 1980.

Snyder, Gary. The Real Work. New York : A New Directions Book., 1980.

Steinwachs, Marie. " A Report On Household Hazardous Waste Management." Resource Recycling. September, 1989, Vol VII Number 5.

Teale, Edwin. The Thoughts of Thoreau. New York: Dodd, Mead, & Co., 1962.

APPENDIX...

A. Wellesley Recycling and Disposal Center

Wellesley, Massachusetts is a community comparable in size and make up to the town of Belmont. It is ranked fifth in the country for its success in the area of recycling. Due to its similarity demographically, it serves as an excellent resource and benchmark for discovering what can be achieved in the area of resource recovery.

Demographics for Town of Wellesley, Massachusetts.

"Wellesley is a suburban Community 13 miles west of Boston. Population 27,000. Approximately 8,500 homes. Area:10.39 square miles. The community consists of residences, professional practices, office buildings, three colleges, shopping districts, but no major commercial or industrial enterprise. Wellesley's legislative branch of government is a limited town meeting type; with elected boards such as: Board of Public Works, the Selectmen, and the School Committee."

DPW

"The town has a consolidated public works division composed of seven divisions : Engineering, Management, Highway, Park and Tree, Water and Sewer, Electric, Recycling and Disposal. The DPW is staffed by 172 full time and 22 part time summer employees."

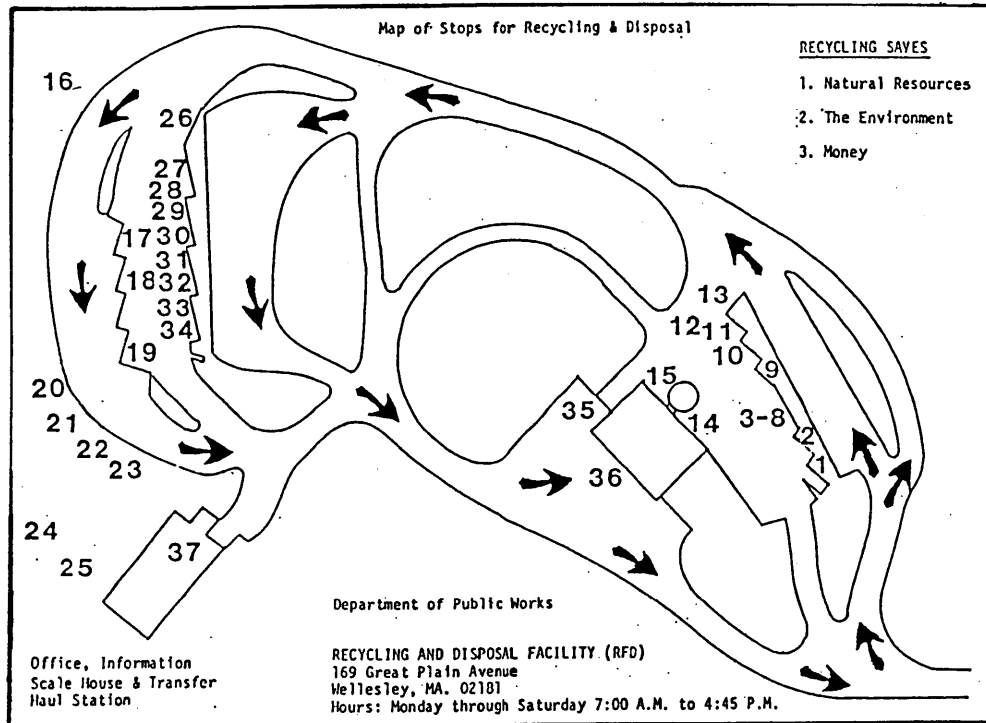
RECYCLING

"Wellesley residents do not desire, nor does the town provide municipal refuse collection. About 75 % recycle - 25% have their refuse removed by private truckers. The recycling center is open 60 hrs. a week - Monday through Saturday : 7am-5pm, with seven experienced and motivated employees. The staff consists of the recycling and disposal division superintendent, one transfer haul lead man, two transfer haul equipment operators, two transfer haul attendants, one recycling attendant. The recycling area is more like a park than a dump. Residents take pride in it, and it is a "must see" on the list of local landmarks for visitors of many Wellesley Residents."

" In summary, recycling works in Wellesley because the Action for Ecology group ignited the spark, the DPW and its recycling and disposal division provided the glue that holds it together, and the local residents provide the power to keep it recycling."

-excerpted from Wellesley's prepared material which is distributed free of charge to interested parties and new residents in the Wellesley Community.

Wellesley Recycling and Disposal Division
169 Great Plain Avenue
Wellesley, Massachusetts



Key to Recycling and Disposal Facility Stops, Wellesley, Ma.

- 1: Cardboard and Corrugated Paper
- 2: Newspaper
- 3: Milk Cartons
- 4: 1&2 Liter Polyester Bottles(clear) - Refundable
- 5: 1&2 Liter Polyester Bottles (green) - Refundable
- 6: Magazines and Catalogues, Phone Books & Misc Paper
- 7: Brown Bags
- 8: Aluminum Foil, TV Trays, etc...
- 9: Glass Clear
- 10: Glass Green, Glass Brown
- 11: Steel, Tin & Bi metal Cans
- 12: Aluminum and Refundable Cans
- 13: Clothing, Small Appliances - Goodwill Trailer -Attended
- 14: Used Engine Oil, Petroleum, Batteries - Automotive
- 15: Tires, Tubes, Rims.
- 16: Leaves and Grass Only - remove plastic bags.
- 17: Brush
- 18: Mattresses, Unusable Building Materials, Furniture, Bulky items, No Metals
- 19: Scrap Metals: Iron, Steel, Aluminum, Copper, Brass...
- 20: "Take it or Leave It " Reusable Furniture, Equipment, Rugs, and Bldg. Materials.
- 21: Sand - free to residents
- 22: Compost - Free to residents
- 23: Ashes only - fireplace - woodstoves ...
- 24: Reusable Gardening Materials - dirt, rocks, peat ...
- 25 : Firewood
- 26,27,29, 30, 31 : Non-Recyclable Trash
- 28, 30, 32, 34 : Newspapers - Small bins.
- 36 : Book exchange - Hard/soft cover - Take it or leave it.
- 37 : Office Information, decals, scale

C. Traffic Planning

Wellesley reports that on its busiest day, Saturday, roughly 4,000 cars visit their recycling and disposal center. It is important to note that Wellesley's facility takes both garbage, i.e. refuse which is not recyclable and which putrefies over time and recyclable trash. Thus, residents are nearly required to make a weekly trip to relieve their households of this garbage.

In Belmont's case, the site takes materials which do not putrefy, and the weekly trip is not a necessity. However, we will use Wellesley's figure as a known verifiable figure.

Using this number we are able to calculate the rapidity with which space must turn over, for an efficient use of Belmont's site.

of cars at peak use..... 4,000
 site open 8 hours

4,000 divided by 8 hours = 500 cars per hour (cph).

There are 13 spaces provided for recycling on each side of the common space. Each car must make two stops one for paper products one for glass, metals, plastic etc.

500 cph divided by 13 spaces = 38 cars, per space per hour.

60 min divided by 38 cars = 1.57 minutes ... the required length of stop.

1.57 minutes per stop is not enough time.

Therefore,

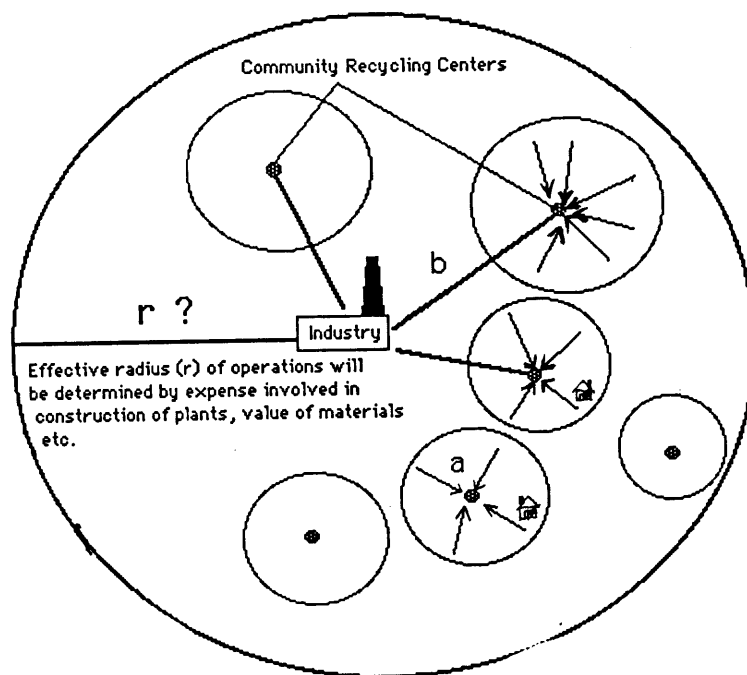
1. Visitors must make an effort to utilize other days of the week.
2. Some may wish to stockpile recovered resources and bring them to the site on a biweekly, monthly, quarterly or yearly basis.

For the site to provide a place for people to commune with each other ten minutes is more appropriate. It will give people a chance to unload their resources and stop briefly to chat with a neighbor or friend who may happen to be there at the same time. Naturally if people wish to talk more they can park near the learning center and do so, or pull away from the recycling areas into the middle of the common space. To achieve a ten minute time frame would require 6 cars per space per hour or 78 cars per hour.

D. Developing Markets for Materials

Finding and developing markets for recovered resources is an essential part of the process if recycling is to become a viable and successful economic proposition.

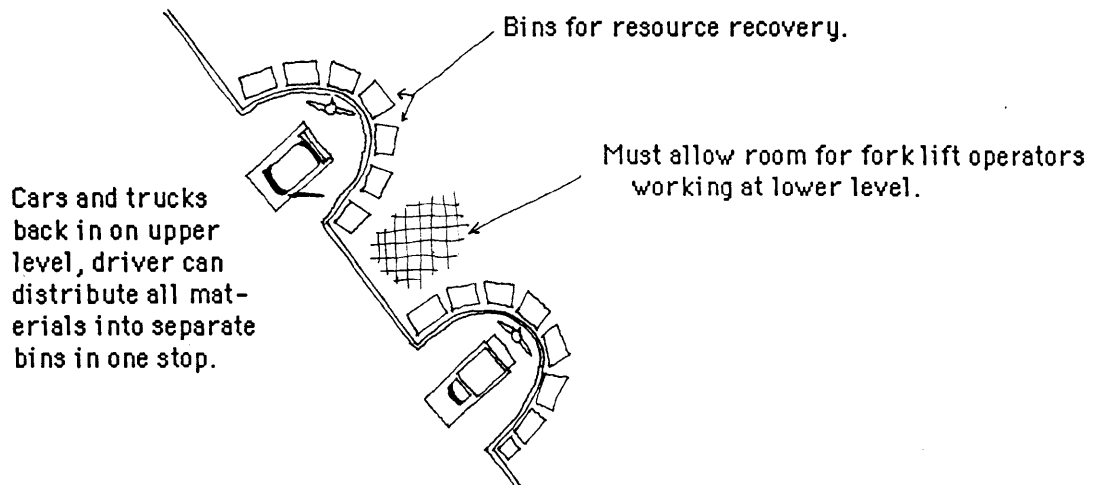
In my proposal, as shown in this diagram residents of a community will bring clean, source separated materials to the recycling center nearest them (a). From there, the filled bins will be transported to the nearest industrial plant (b) which can transform and recycle these resource materials into new products.



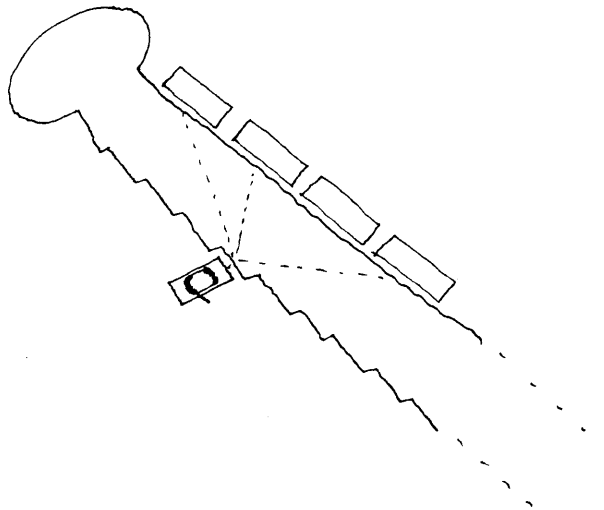
To support and encourage the development of this infrastructure, local and even national tax incentives should be put in place to encourage industry to build plants capable of providing the markets and the services. Thereby insuring that in the near future these plants will dot the landscape at intervals which will provide efficient and economical radii within which materials can be transported to market.

E. Alternative Bin Configurations for Recycling Area:

1. This is a more labor and capital intensive approach. To provide recyclers the convenience of one-stop-drops, there must be many small bins and one, perhaps two, fork lift operators who will collect bins when full and empty them into larger bins located elsewhere on the site.



2. In this configuration bins are situated parallel to the drop area. This makes the entire bin easily accessible. However, the person making the drop must walk longer distances which lengthens the duration of the visit.



F. Action Agenda

The following suggestions are offered as guidance to town leaders who may wish to implement a recycling program in their community:

1. Education. It is very important that members of a community be made aware of the recycling goals of the community. A comprehensive packet of materials can be put together by the town explaining everything, from where the resource recovery center is, to the way in which materials should be delivered to the site. This brochure can be mailed to every member of the community. Schools and churches in the area can also be relied on to help spread the word on recycling.
2. Towns could mandate that all town business be carried out on paper with recycled fiber content.
3. All town offices could recycle paper.
4. All public schools could recycle and use recycled paper products. Paper towels, toilet paper, lunch room napkins, are available which use recycled fiber.
5. The town may request that local businesses use recycled paper products and provide containers for collecting cans and bottles. Perhaps tax breaks or incentives could be given to those that do.
6. Encourage homeowners to recycle and keep them informed about how successful the town's recycling program is, through mailings which can accompany water, sewer, and/or municipal light bills.

Sources of Recycled Products.

| | |
|--|--------------|
| Seventh Generation. 10 Farrell Street. South Burlington, Vt. 05403 | 800 456 1177 |
| Cross Pointe Paper Corp. 1185 Ave. of the Americas, Ny, Ny. 10036 | 212 575 4665 |
| The Recycled Paper Co. 185 Corey Road. Boston, Ma. 02146 | 617 277 9901 |
| Earth Care Paper Inc. Bx. 3335, Dept. 99 Madison, Wi. 53704 | 608 256 5522 |

G. Introduction to The Japanese Garden (excerpted in its entirety)

There are only two attitudes towards nature. One confronts it or one accepts it. The former finds in nature but the rawest of materials to do with as one will - a form is imposed upon chaos. The latter discovers in chaos a new kind of naturalness - and to naturalize nature is to accept it.

The histories of Western and Eastern gardens indicate these two attitudes are both supported by a philosophy and a metaphysics. In the Occidental garden, trees are ordered, paths are straightened, and a visible form is imposed. A person always knows where he is in such a place. He sees it from above, as it were. He will never become lost while taking a stroll because he, the lord of creation, has himself made his garden. Like his deity he has crafted order from chaos and feels himself somewhat god-like.

In the Oriental garden it is nature and not the gardener which does the creating. The line of a stone, the mass of a tree, the contour of a hillock - all of these things are observed and worked into a pattern which the garden architect has perceived, a pattern which, because it is natural, is unique. Since he is always inside his garden, the viewer is surprised by a new vista, an unexpected view - he arranges for it. His natural garden will change with the seasons, just as those who see the garden will change with the years.

Both kinds of gardens represent a kind of ideal. The Western garden represents ambition attained, nature subdued. It is an illustration of the humanist ideal: man is the measure of all things.

The Eastern garden and its assumptions are quite different. Man finally and firmly becomes a part of nature itself. There is no assumption that there is something better than nature. Nature is itself and that is enough. Though the Japanese have much to fear from nature - yearly typhoons, floods, earthquakes - they have also found much to respect. They have found, among other things, their own self respect in recognizing that they are themselves a part of nature. The man who can accept nature can also accept himself.

This acceptance of self is something which no Westerner can be said to have failed since so few attempt it. His way is different. He idealizes himself and, consequently, his natural surroundings. Hence his philosophical poise, his assurance, which, by its very grandeur, suggests aspirations inconsistent with acceptance.

To accept yourself completely you must also accept your own mortality, and this is what, somehow, and admittedly at enormous expense, some Asians have been able to do. They can celebrate the changes of the seasons and still not feel that April is the cruelest month; they may contemplate the truly permanent with a dignity which does not allow easy if ironic thoughts of Ozymandias. Though sometimes sentimental and usually given to the pathetic fallacy, the Japanese rarely allows the merely anthropomorphic to cloud his perhaps unique vision of the timeless.

G. continued...

This is because by sacrificing an urge to immortality, and through a knowing acceptance of himself and his world, he stops time. He has found a way to freeze it, to suspend it, to make it permanent. He does this not through pyramids and ziggurats, but by letting it have its own way.

This is seen no better than in the Japanese garden where the seasons may change nature's skin, but the bones - rocks, water - are always visible, always unchanged. The Japanese garden is like a still picture - a frozen moment which is also all eternity. It remains the same no matter the season because the seasons are acknowledged, and this acknowledgement is spiritual, a combination of idea and emotion. As an old saying has it: "...gazing upon the mountain one's knowledge is widened: looking upon the water one's feelings are increased."

A mountain for intelligence, a lake for feelings; solid stone and fluid water. These are the antipodes of Asia. Its mountains and its seas are its only realities. Rocks to make mountains, waters to make oceans - the everyday stone and the commonplace pool allowed to express their natures, allowed to whisper their meaning. This is what the Japanese garden has been about from the beginning. It is a celebration of the elemental, a glimpse of nature bare, an analysis of the world in which we live.

One recognizes the feeling in Zen Buddhism, the influence of which upon the Japanese garden, as we shall see, has been extreme. Just as Zen insists that one free oneself from this world of which one is a part by perceiving this oneness with the world, so the notion of nature seen in Japanese landscape gardening allows the forest to be seen despite the trees, the garden despite the rocks. Just as one, freed, may look upon and into oneself, so - in the garden - one sees an equally freed world, one which has been both physically reduced and spiritually enlarged to suggest the proportions of nature. With this nature, things as they truly are, as a guide, one makes a garden which is not so much the ideal of the garden as the essence of the garden...

Ikkyu, a fifteenth-century Zen priest, said that he loved the bamboo as his friend and that he respected water as his master. He belonged to this earth and accepted nature because, to his mind, there was no alternative to this acceptance. To this mind, the word 'beauty' means the beauties of nature. A 'beautiful flower' has always existed, but 'the beauty of a flower' cannot exist because the beauty cannot be abstracted from the flower.

Which is not to say that the beautiful flower or the beautiful tree is not to be improved upon. Ask the Japanese gardener the secret of gardening and he will hold up his pruning shears. But this pruning, called *sentei*, allows a more natural and, at the same time, more ideal beauty to emerge. The beauty is there from the first. It is not created, it is merely allowed to express itself in a louder voice and in plainer terms. The beautiful garden lives. The gardener merely makes the beautiful garden more visible.

G. continued...

In doing so he incorporates not only the visible lines, the rocks, the trees, he also makes valuable the invisible, namely the effect that time will have upon the garden. He reckons the effects of the seasons on this garden he is releasing rather than creating; he calculates the life of the tree, the life of the stone. He does this not to evade these qualities but to incorporate them. He observes the laws of mujo, or mutability, and that of seisei-ruten, or the perpetual change of the universe. The garden lives. It grows, it changes. By incorporating into it the idea of change, the idea even of death, it triumphs over death itself - it is alive.

Such observance and acceptance of nature gave rise to an aesthetic theory of great importance. Just as everything is mutable, so everything is unique. There are no two things - trees, rocks - exactly alike. One does not strive for the perfect tree, for who is to say what perfection consists of in a world where each tree is different? Rather, then, one searches for the tree which clearly expresses its own unique individuality, for the rock which shows its difference.

In the same way, any composition which seems perfect, which shows a balance that could not be bettered, is of no use in a garden made up of objects the very identity of which must also suggest imperfection. To insist upon a harmony other than the underlying one naturally revealed in nature is, precisely, unnatural.

H. Excerpts from : Personal Action Guide for the Earth
101 Ways to Save the Earth

1. Reduce consumption wherever possible.
2. Use mugs instead of paper cups, rags instead of paper towels, cloth instead of paper napkins.
3. Double-side photocopies; use reverse sides of paper.
4. Buy products in bulk or with the least amount of packaging.
5. Bring your own shopping bag to the market.
6. Buy products that are recycled, recyclable, reliable, repairable, refillable, reusable, avoid disposables.
7. Mend and repair rather than discard and replace.
8. Buy beverages in returnable containers; avoid non-recyclable containers.
9. Ask for recycled paper at stationers and printers.
10. Recycle/reuse motor oil, tires, and scrap metal.
11. For infants, use cloth or biodegradable diapers.
12. Pressure local fast food chains and other businesses to end wasteful packaging procedures.
13. Buy products that will last.
14. Avoid impulse buying. Read labels and research the products you plan to buy.
15. Borrow or rent items you use infrequently, and maintain and repair the items you own to insure longer product life.
16. Remove excess packaging and leave it in the store, make it their problem.
17. Do not use plastic bags, request paper bags at stores.
18. Separate your recyclable garbage (newspaper, glass, paper, aluminum, and organic wastes if you have a garden); only send to the landfill what you can't reuse.
19. Study your communities' waste disposal system and oppose any plans to build more landfills or garbage incinerators.
20. If you don't have a recycling center, lobby your city council to establish one.
21. When purchasing a home, check for its energy efficiency.
22. Get a low-cost home energy audit from your utility company.
23. Invest in ample insulation, weather stripping, and caulking.
24. Use natural gas rather than electricity for heat and appliance.
25. In winter, turn down your thermostat a few degrees, especially at night and when the house is empty.
26. Wear a sweater or other warm clothing in cooler temperatures.

H. continued...

27. If there are windows near the thermostat, keep them tightly closed.
28. Keep fireplace dampers closed unless you have a fire going.
29. Avoid air conditioning as much as possible.
30. Close off and do not heat unused rooms; use insulating shades shades and curtains on cold winter nights and hot summer days.
31. Avoid keeping your refrigerator or freezer too cold.
32. Add an insulation blanket to your water heater; turn it down to 120 degrees.
33. Use a clothesline rather than a dryer whenever possible.
34. Keep the lint screen in the dryer clean.
35. Instead of ironing, hang clothes in the bathroom while you bathe or shower.
36. Don't buy motorized or electric tools or appliances when hand operated ones are available; this includes lawnmowers.
37. Buy high-efficiency electrical appliances.
38. Use outdoor lights only when necessary.
39. Use low-watt light bulbs.
40. Install plastic storm windows or new "superwindows".
41. Plant deciduous shade trees that protect west windows from summer sun but allow it in during the winter.
42. Buy local and recycled products to cut indirect energy use.
43. Monitor the environmental and pricing policies of your local energy utility.
44. Explore whether municipally owned power might be an option in your city.
45. Install sink faucet aerators and water-efficient showerheads; these use two to five times less water with no noticeable decrease in performance.
46. Take showers of less than five minutes, not baths, to cut water consumption.
47. Do not let water run when it's not actively in use for showering, shaving, brushing teeth, or hand washing clothes.
48. Consider installing ultra-low-flush toilets, which use 60-90 percent less water than conventional models.
49. Use water-efficient washing machines and dishwashers, and run them only when full.
50. Use greywater from wash for plants and garden.
51. Collect rainwater and set houseplants outside during rainstorms.

H. continued...

52. Diligently repair all leaks and drips as soon as they occur.
53. Consult your nursery about plants native to your environment or from similar climates that require little or no watering.
54. Buy phosphate-free, biodegradable soaps and detergents; ask your supermarket to carry them if it doesn't already.
55. Find out where your water comes from, what is in it, and what is being done to test or treat it. If your water is contaminated: demand that elected officials enforce laws on water safety and get the institution responsible for it to pay for cleaning it up.
56. Consider how production of your food effects the environment.
57. Eat lower on the food chain-vegetables, fruits, and grains; decrease consumption of meat and animal products.
58. Learn vegetarian recipes and encourage restaurants to serve vegetarian foods.
59. Be creative with leftovers.
60. The higher on the food chain we eat, the more natural resources and pesticides we consume. Animals raised for food in the United States eat enough grain to feed more than five times the U.S human population; if Americans reduced meat eating 10 percent, the 12 million tons of grain saved annually could feed all the people on earth who starve to death. Animal agriculture is responsible for: 85 percent of topsoil loss; 260 million acres of forest destruction; over half our water consumption; 20 billion pounds of manure everyday, contaminating ground water; and 25 times the fossil fuel needed to produce the same amount of protein in grain. Pesticides poison groundwater, kill wildlife, and trigger the spread of bugs and weeds resistant to pesticides.
61. Read the labels on food; buy foods that have not been heavily processed.
62. Support laws that ban harmful pesticides and that require disclosure of pesticides, drugs, and other chemicals used in food production; support markets that offer contaminant-free food.
63. Buy organic food, locally grown if possible.
64. Don't buy foods out of season.
65. Shop at local farmers markets or cooperatives.
66. Encourage your markets to stock locally grown products.
67. Grow a garden rather than a lawn, saving water and energy.

H. continued...

68. Grow sprouts and herbs in a kitchen window.
69. Plant fruit and nut trees.
70. Be aware that many consumer groups question the health and environmental safety of food irradiation.
71. Draw local attention to hunger issues at home and in the Third World.
72. Support genetic diversity by planting rare and heirloom species of fruits and vegetables.
73. Inform yourself about the increasing corporatization of American agriculture; support family farming however possible.
74. Inform schools, hospitals, airlines, and media of your food concerns.
75. Donate healthy food to local food shelves.
76. The private automobile is one of the biggest single threats to our environmental health. Carbon-laced exhaust is a major contributor to the global greenhouse effect; lead emissions cause brain damage; carbon monoxide is a well-known health threat; asbestos from brakes ends up in the water supply. In addition, the land gobbled up and paved over by our proliferating army of automobiles brings a host of other ecological consequences, ranging from polluted water run-off to rising urban temperatures. Increasing use of autos leads to increasing use of oil, a non-renewable resource that badly pollutes the environment in its extraction, transportation, and refining. All alternatives to the auto, ranging from passenger trains to computer link-ups, should be encouraged, and everyone should drive less.
77. Live within walking distance of your job and shopping areas.
78. Arrange or join a car pool for commuting.
79. Use public transportation whenever possible.
80. Bike or walk.
81. Buy the most fuel-efficient car you can. Aim for 35 miles per gallon and don't buy a bigger car than you need.
82. Properly maintain your vehicle, getting a tune up every 10,000 miles.
83. Use radial tires.
84. Check tire pressure at least once a week.
85. Buy a light-colored car with tinted glass; it will need less air-conditioning.
86. Remove unnecessary articles from your car.

H. continued...

87. Don't speed. Drive at a moderate pace.
88. Drive smoothly, slow down gradually, accelerate gradually.
89. Plan your trips carefully. Choosing the shortest, least congested route will save fuel.
90. Avoid city driving.
91. Use Amtrak rather than airplanes; let Congress know you support Amtrak.
93. Lobby local and national leaders for building light rail lines or improving bus or subway service in your community.
94. Industrial nations manufacture some 70,000 different chemicals, most of which have not been thoroughly tested for toxicity. Toxins can accumulate in the body without causing ill effects until years later. Toxic substances thrown in trash go to landfills or incinerators, and end up in our air, water, and soil. Some chemicals contribute to global warming trends.
95. Read labels of household products; buy the least toxic products available or use non-harmful substitutes.
96. Avoid aerosols and other products containing CFCs.
97. Avoid purchasing clothes that will require dry cleaning, because it uses toxic chlorinated solvents; dry clean only when necessary.
98. Request your local government to set up a system for collecting and recycling the CFCs in old refrigerators and air conditioners.
99. For insects, use natural pest control products.
100. Be aware that synthetic fibers may produce hazardous gases, especially when brought in contact with household chemicals.
101. Test your home for formaldehyde gas; beware of products that may contain it: chipboard, plywood, insulation, carpet, and upholstery.
102. Contact your elected representatives to mandate household collection of hazardous wastes.
103. Support legislative initiatives that encourage industry to modify manufacturing processes to eliminate the production of hazardous wastes, and reduce, recycle, reuse what is produced.
104. Be aware of boycotts of environmentally destructive companies.
105. Join with neighbors to ask local companies to reduce their use and production of toxic chemicals and waste.

H. continued...

- 106. Check the side effects of prescription drugs.
- 107. Use simple means in your daily tasks and avoid unnecessarily complicated instruments.
- 108. Avoid "novophilla"- love of what is new merely because it is new.
- 109. Appreciate Ethnic and cultural differences among people. Be concerned about the situation of Third and Fourth World people and attempt to avoid a standard of living too much higher than them.
- 110. Pursue depth and richness of experience rather than intensity.
- 111. Appreciate and choose, when possible, meaningful work rather than just making a living.
- 112. Cultivate life in your community.
- 113. Satisfy vital needs rather than desires.
- 114. Appreciate all life-forms rather than merely those considered beautiful, remarkable, or narrowly useful.
- 115. Never use life-forms merely as means. Remain conscious of their intrinsic value and dignity even when using them as resources.
- 116. The environmental crisis cannot be solved entirely by modifications in our lifestyle. We must also change our thinking about humanity's relationship to the natural world and to one another.

The above is excerpted from:

Personal Action Guide for the Earth

**Friends of the UN
 Transmissions project
 730 Arizona Avenue
 Suite 329
 Santa Monica, California
 90401**

101 Ways to Save the Earth

**Greenhouse Crisis Foundation
 1130 17th Street NW
 Washington, D.C.
 20036**

I. Goals That Evolved For The Recycling Center

While creating a design and thinking about the issue of recycling a number of objectives, in the form of questions, began to take shape in my mind:

Is there a way the facility could be designed which would challenge our preconceptions about trash and thus transform our thinking?

Could a relationship between the built and the natural be made which could bring meaning to the place?

How could the center be designed to reveal its purpose and make evident that it is one step in a process?

We will return to this place again and again. How can it be imbued with characteristics which will make return visits more enriching?

How can the site promote notions of transformation and renewal which are at the root of recycling and link them with the human spirit?

In what ways can the design of the site contribute to new methods of managing waste and help set new standards for the future?

How can the site encourage positive links with the community and encourage community participation?