Parcel ~ 20 Year Plan

Water Management Strategy

- Rain barrel and cistern stormwater/rainwater and grey water storage
- Grey water recycling for irrigation
- Drought resistant landscaping
- Vegetated/mulch-filled swales for on site retention of stormwater and ground water recharge, with tax incentives /non-compliance penalties
- Increase tree cover to regulate temperature and manage stormwater

Water: Potable and 'Waste'

- Grey water separation, storage and reuse
- Low flow appliances and systems
- Tax incentives for retrofits of existing systems
- All new bldg must be designed with water conservation in mind
- Residential metering of water
- Block-pricing for potable water
- Sanitary systems to use grey water

Waste

- Reduce, reuse, recycle
- Separation of waste including household, construction, sewage/greywater
- Mulching, composting green waste

UBC URBAN STUDIO, FALL 2002 TWO NEIGHBOURHOOD PATTERNS

Energy

- Tax incentives for retrofit of current energy consuming appliances
- Utilize energy options such as 'Power smart' appliances
- Utilize alternative energy options such as heat pumps, solar panels, wind generators
- New construction with mandatory BMPs, including orientation, bldg materials and structural design, insulation, alternative energy, double envelope, green architecture (greenroof), tree planting, permeable paving, dry well runoff storage systems, berms, curb-less lot/street connection
- Increase density to reduce
 infrastructure costs per capita



- production
- Increase density from single family to multifamily.





Moffat 2001

Parcel ~ Surrey 20+ Year Plan

Eliminate pesticides, herbicides, non-organic fertilizers from residential gardens

Increase tree cover to regulate temperature and manage stormwater. Fruit trees could be planted as a food source



Goals:

- Further increase density by rezoning to allow other housing types
- Tax incentives for retrofits to best available technologies, such as green roofs, composting toilets, and alternative energy production
- Local energy generation using alternate methods such as methane, fuel cells, solar panels, wind, water weirs





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Block Level ~ 20 Year Plan

All new development will use green infrastructure, permeable surfaces, solar orientation, solar power, narrow streets, roadside swales, and provide walkability.

Re-zoned for multi-family dwellings, many houses have been subdivided, some adding additional side or back of house garages.

Vegetated islands in cul-de-sac provide permeability, slow traffic and beautify neighbourhood. Maintained by neighbourhood voluntary association.



Tax

Tax Incentives to dig backyard swales, reducing run off. City no longer collects green waste, mulch trenches are dug.

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Goals:

- Decrease impervious surfaces.
- Localise sorting of waste

Black water is taken via gravity and pumps using existing infrastructure to constructed marshlands for treatment. The marsh provides sewage treatment, a water amenity and habitat.





Goals:

- Decrease outputs to sewage system
- Increase local self sufficiency with green infrastructure
- Close the neighbourhood system as much as possible





Narrow street widths to 2 lanes and remove street curbs. Released land can be trenched and used as a depository for mulch, planting and stormwater detention. Mulch can absorb 75-80% of its volume in water.





Re-design cul-de-sacs to act as mulch depositories, stormwater detention basins and sites for groundwater recharge. The added vegetation would improve the streets' appearance.

Plant street trees. The increase in vegetative mass along streets to encourage evapo-transpiration and canopy interception of precipitation. These simple processes help decrease the amount of runoff.

Trees shelter homes from wind, sunshine and rain. They help to regulate temperature.

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New housing developments must use pervious road materials, construct roads with narrow widths, use lanes to access homes, and integrate stormwater measures in the street drainage systems. Areas next to **riparian buffers** need to be protected with setbacks enforced. Native shrubs and trees should be planted where the riparian buffer has been compromised.





- Reduce impervious surfaces.
- Narrow street widths.
- Increase vegetative mass along roadways.
- Redesign cul-de-sacs as detention basins with vegetation





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District to 100 Years

- Create public amenities from stormwater management ponds, constructed wetlands and sewage treatment marshes using brown-fields and floodplain sites.
- Institute policies providing incentives to incorporate ongoing technological changes
- Recyclable materials shipped to users of the resource
- Non-recyclable waste and hazardous waste to sub-district depot locations and transfer to central landfill. Reduce, reuse, recycle
- Take advantage of natural systems for energy production, ie tidal, wind and river flow
- Separation of waste including household, construction, sewage/greywater
- Mulching, composting green waste
- Incentives for retrofits of existing systems
- All new building must be designed with water conservation in mind
- Residential metering of water
- Block-pricing for potable water
- Sanitary systems to use grey water
- Long-term sewage treatment on a parcel and block level with composting toilets and greywater recycling
- Potable water from existing sources at regional level, augmented by local supply, eg. aquifers, reclaimed water dependant upon technology
- Energy produced where possible at local levels from a variety of technologies, including bioponics, hydro/tidal, solar, landfill methane capture, industrial waste heat, with surplus demand supplied by existing regional district level power grid
- Waste sorted on site as much as possible
- Green waste to remain on site

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<u>Goals</u>

- Decentralisation of
- infrastructure based on a sub-district model.
- Treatment of sewerage at parcel and neighbourhood facilities.
- Reduction of overall length of infrastructure.



ISSUE-BASED CHARRETTE

Surrey Urban Infrastructure Group Report

The group addressed the provision of services traditionally delivered by municipal or regional infrastructure. Surrey's municipal systems were examined with the goal of providing a more sustainable infrastructure model through the principle of decentralisation. Households will reduce their draw on municipal energy, water, and waste treatment systems through autonomous energy production, eliminating parcel run-off, recycling grey water and taking responsibility for compostable waste. The majority of change over the next 20 years will take place at this parcel level. Once household demand on systems is substantially reduced, the creation of block or neighbourhood infrastructure becomes possible. The group explored the local provision of sewage treatment, hot water, storm-water retention and heating. Questions remained about available technology for the local provision of reclaimed potable water, though this is seen as a possibility in a longer-term vision. At the corridor level the group demonstrated the possibility of decreasing impervious surfaces, both through different choices in road surfaces and vegetating land reclaimed when cul-de-sacs are converted to through-streets. The corridor changes also provide the opportunity to add local cisterns for water retention or for sewage treatment and use non-recyclable construction waste for roadbeds. Street re-design and stream re-creation increase neighbourhood connectivity, making possible a reduction in energy spent in transit.

District-level action is minimized, providing mostly policies such as incentives for households and developers to use best available technology for new construction or retro-fits, and accept responsibility for consumption and waste. Some physical dependence on the district level did remain as a central collection point for hazardous waste and recyclables which are collected in volume before being shipped abroad. There was much debate as to how much dependence would remain on existing municipal systems. Potable water during dry times and energy during peak times were the dominant concerns. The ability of a neighbourhood to become a truly closed system seemed somewhat beyond reach. The group is uncertain both of technology and of future consumption levels.

The group strongly supports the premise that source or local responsibility for the prevention, recycling and processing of waste will be the route to sustainability. Smaller, greener and more flexible infrastructure is generally less expensive to install and maintain. We are assuming a period of transition while the current systems are serviceable, working towards a complete break at the time these systems would require massive repair. The reduced cost and limited environmental impact are two aspects of the proposed systems' sustainability. Some, such as bio-ponic greenhouses or sewage treatment marshes are also productive, providing bedding plants, on-land fish farming. educational and research opportunity, and public amenities to increase community connection and even to increase land value. Such infrastructure also provides some local employment, helping to address the jobs/housing balance.

Difficulties & Contradictions:

Definition of Terms: For example, what is a 'district' for sustainable urban infrastructure? The smallest watershed? Growth areas? All of Surrey?

Imagining the Future:

Are we projecting todays comsumption levels? How will individual comsumption change? How will technolgy change our lives?

Governance and Public Acceptance:

Will a plan heavily reliant on individual and household action succeed? Will local governments be willing to risk re-election and impose unpopular initiatives such as block pricing for water or the non-collection of green waste? The group did not feel people would simply "do the right thing." The group was consistantly amazed by the readily available technology, so this is not the problem. The problem is political will and public acceptance. A paradigm shift is required for any of these to be possible. We found no answers for that.

The Informal Economy:

What will happen when the currently informal system of "rag-picking" with recycled goods is institutionalised?

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