

Risk Based Land Use Criteria

by

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Introduction to Risk Based Land use Planning

Introduction:

- ❑ The focus is on what benefits the community as a whole.
- ❑ Industrial, commercial, retail, business activities are key to providing employment and taxation to benefit communities.
- ❑ Residents expect community amenities and activities within pleasant surroundings (Quality of Life).
- ❑ Community growth is through developments. Land use zoning is needed to maintain an inventory of land to sustain a community's growth.
- ❑ In summary an harmonious relationship is needed.
- ❑ Unfortunately industry brings with it hazards and consequently "risk". Communities are not only concerned about these risks but they expect to not be annoyed by nuisance issues like odours, noise, lights. Sounds, etc.

Introduction to Risk Based Land use Planning

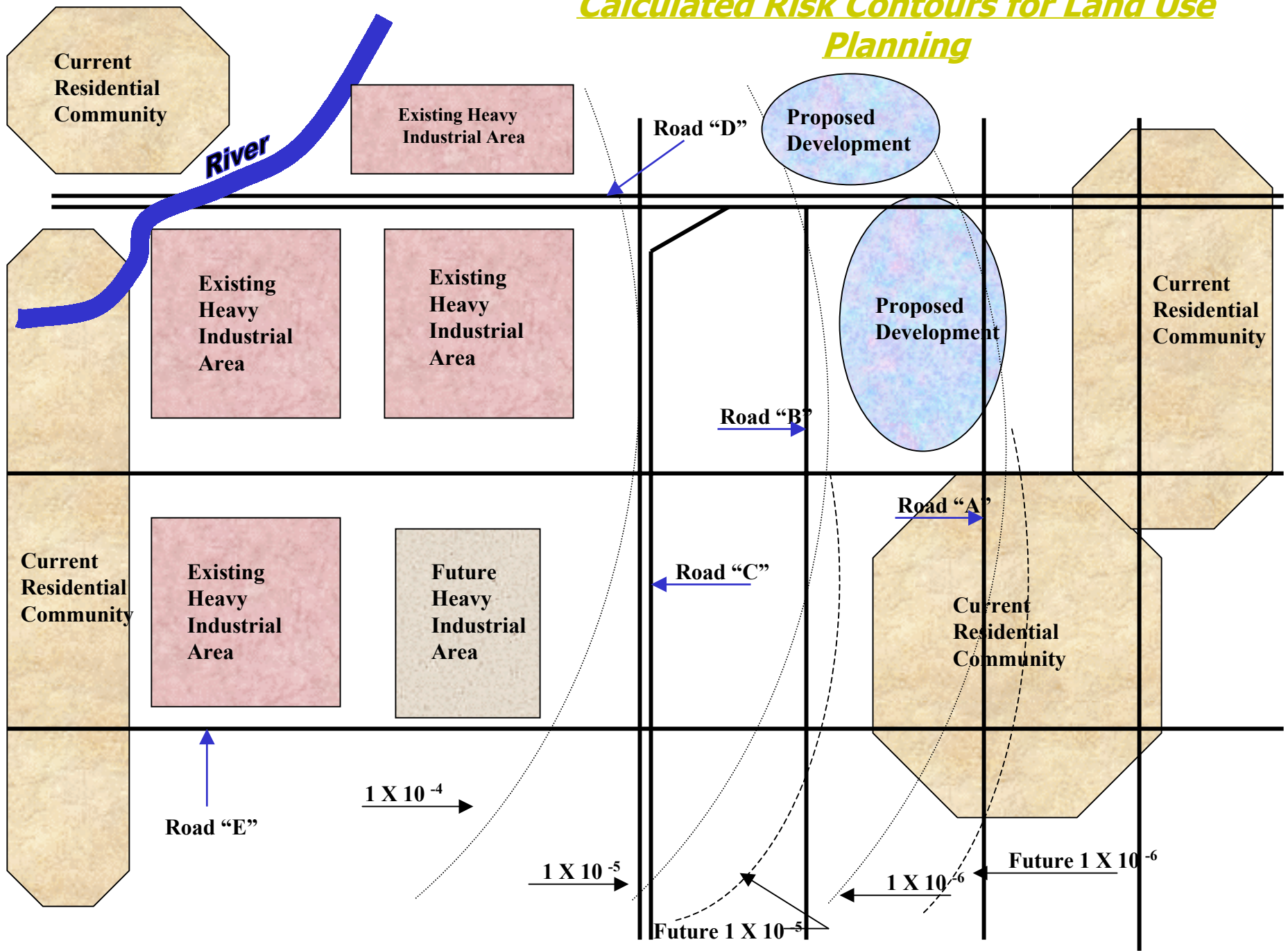
- ❑ Bhopal showed us the need for effective separation distances which have been defined as risk levels. 1×10^{-6} chances of a fatality as a result of an industrial incident to an individual over a year is considered to be acceptable around the globe today. A very small number.
- ❑ In Canada the MIACC approach is our response as a recommended, but not a regulated, approach to land use planning. Although failing to follow the guideline is done at ones peril.
- ❑ Land between industry and residents is called a separation zone. It is often very valuable land to developers and can be a taxation bonanza for the municipality. Obviously there is often a bias towards development.
- ❑ The municipal bureaucracy and politicians are put in the position of making decisions with little knowledge of risk (of Bhopal), and lots of pressure to grow, to build, to tax, to look good.

Introduction to Risk Based Land use Planning

Let's Look at the Facts:

- ❑ Developers are key to community growth and are always looking for opportunities.
- ❑ Municipal bureaucrats are not as well versed in risk analysis as they could be. They do not have risk based approaches to assist with their decision-making.
- ❑ Municipal politicians are less likely to understand a risk based approach. Their backgrounds in almost all cases have not prepared them for this.
- ❑ Residents are putting pressure on them as a result of nuisance issues and their perceptions of risk.
- ❑ Industry wants the ability to expand on site but at the same time remain out of the public's eye. They want as much open space between them and the public as possible.
- ❑ The closer the population encroaches on industry the more nuisance complaints result. The closer the population gets the more money needed for risk mitigation by the company leading to the distinct possibility industry will pull out of the area.
- ❑ The closer the population gets the more need for emergency response capability which costs money.

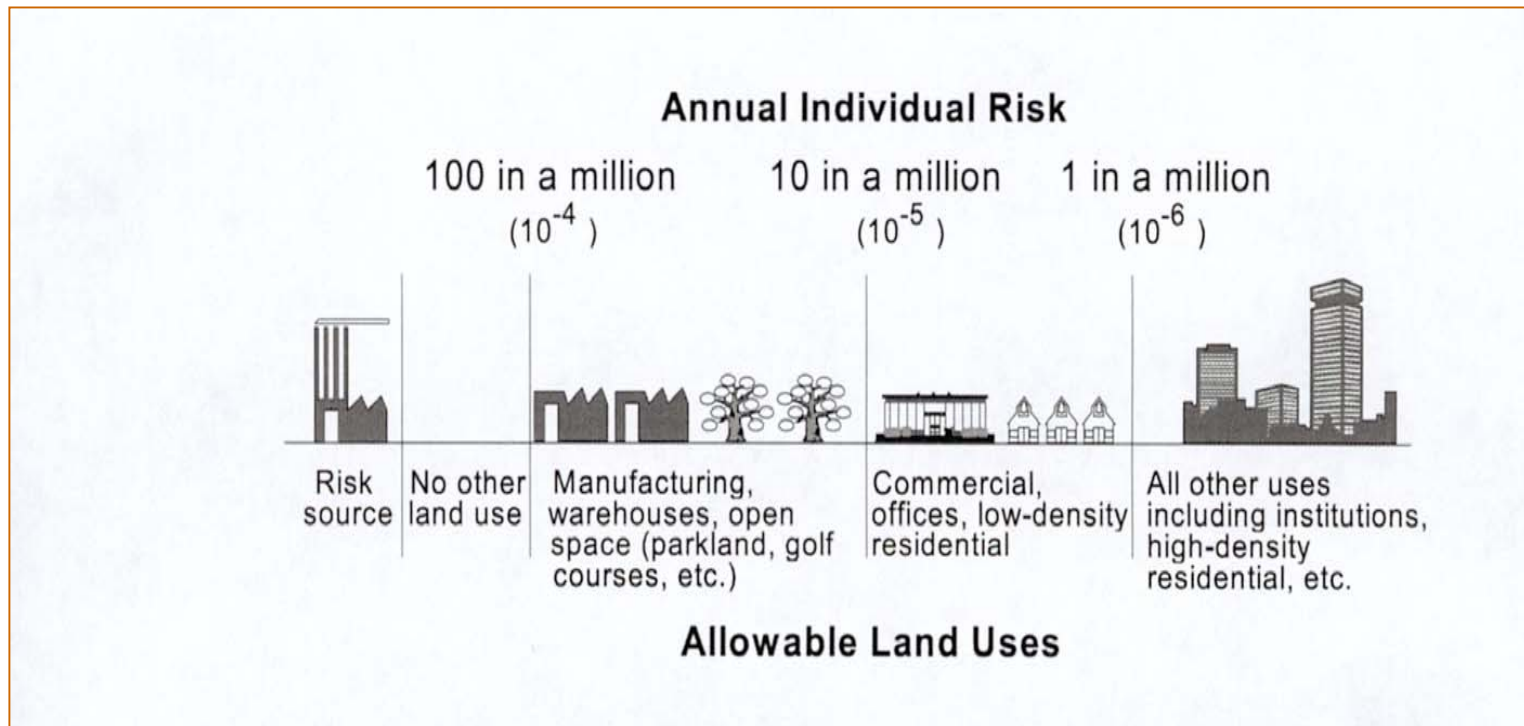
Calculated Risk Contours for Land Use Planning



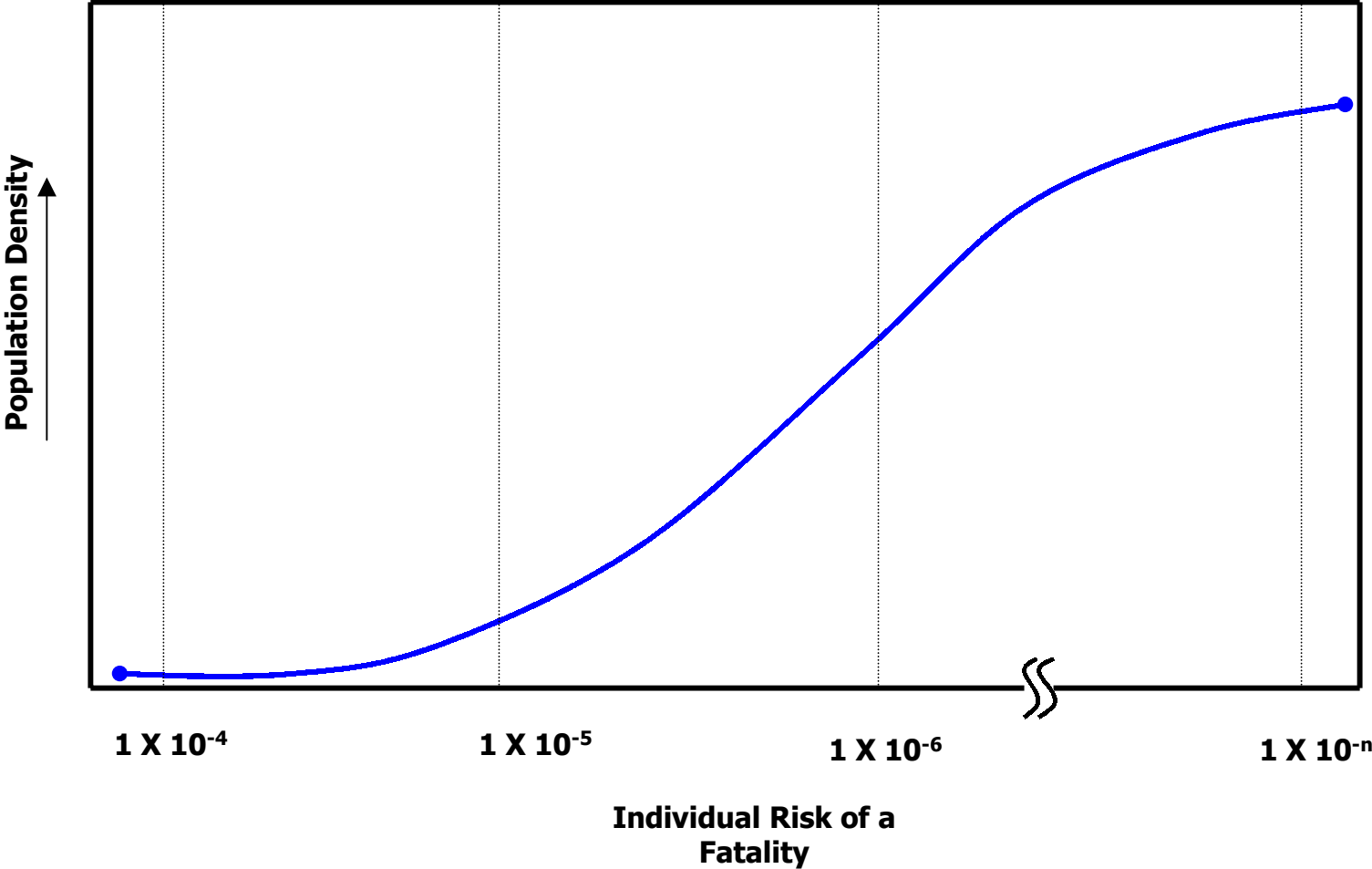
Canadian Acceptable Level of Risk

MIACC

(Major Industrial Accidents Council of Canada)

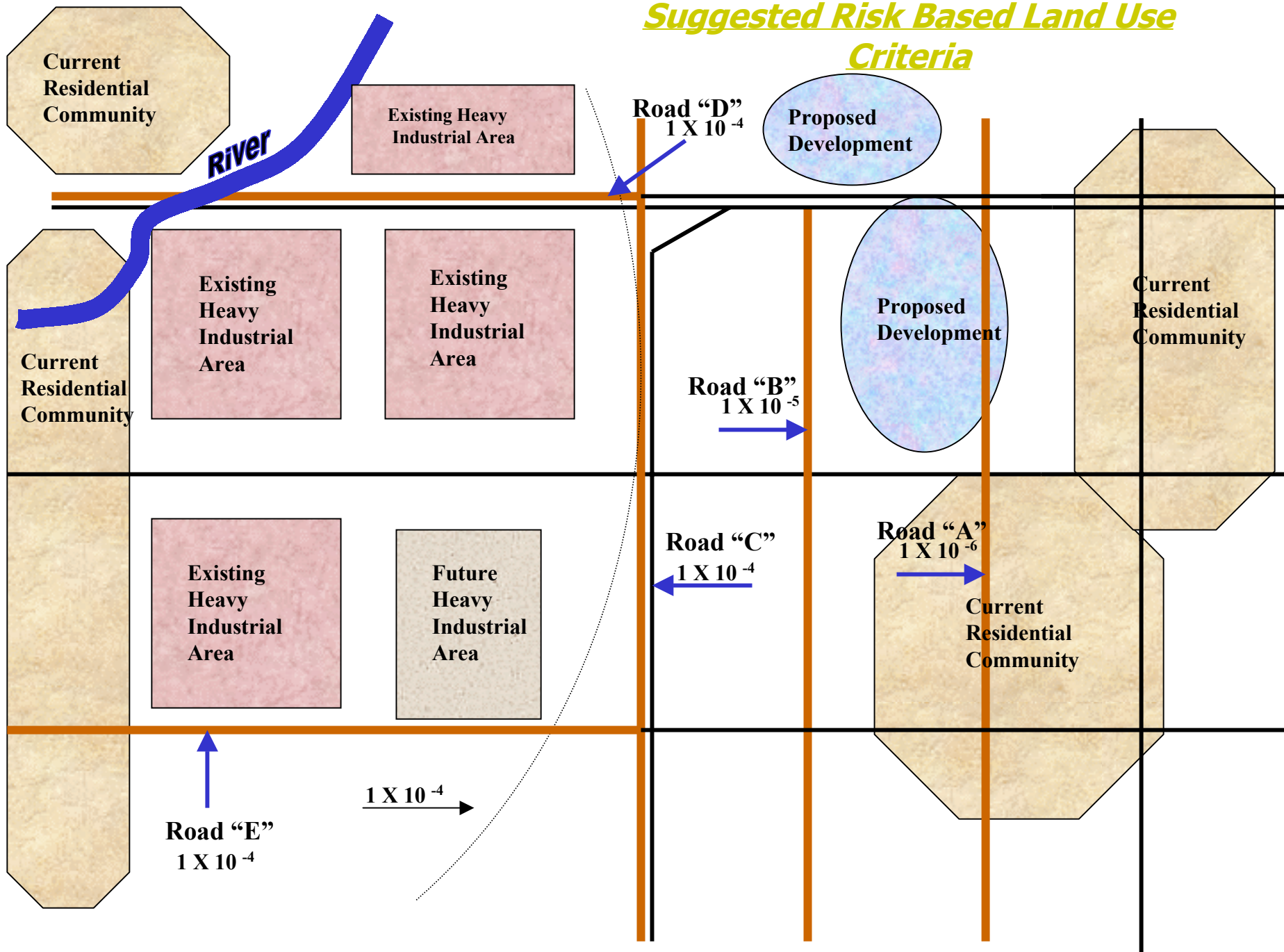


Density - versus- Distance from Risk Source MIACC Criteria

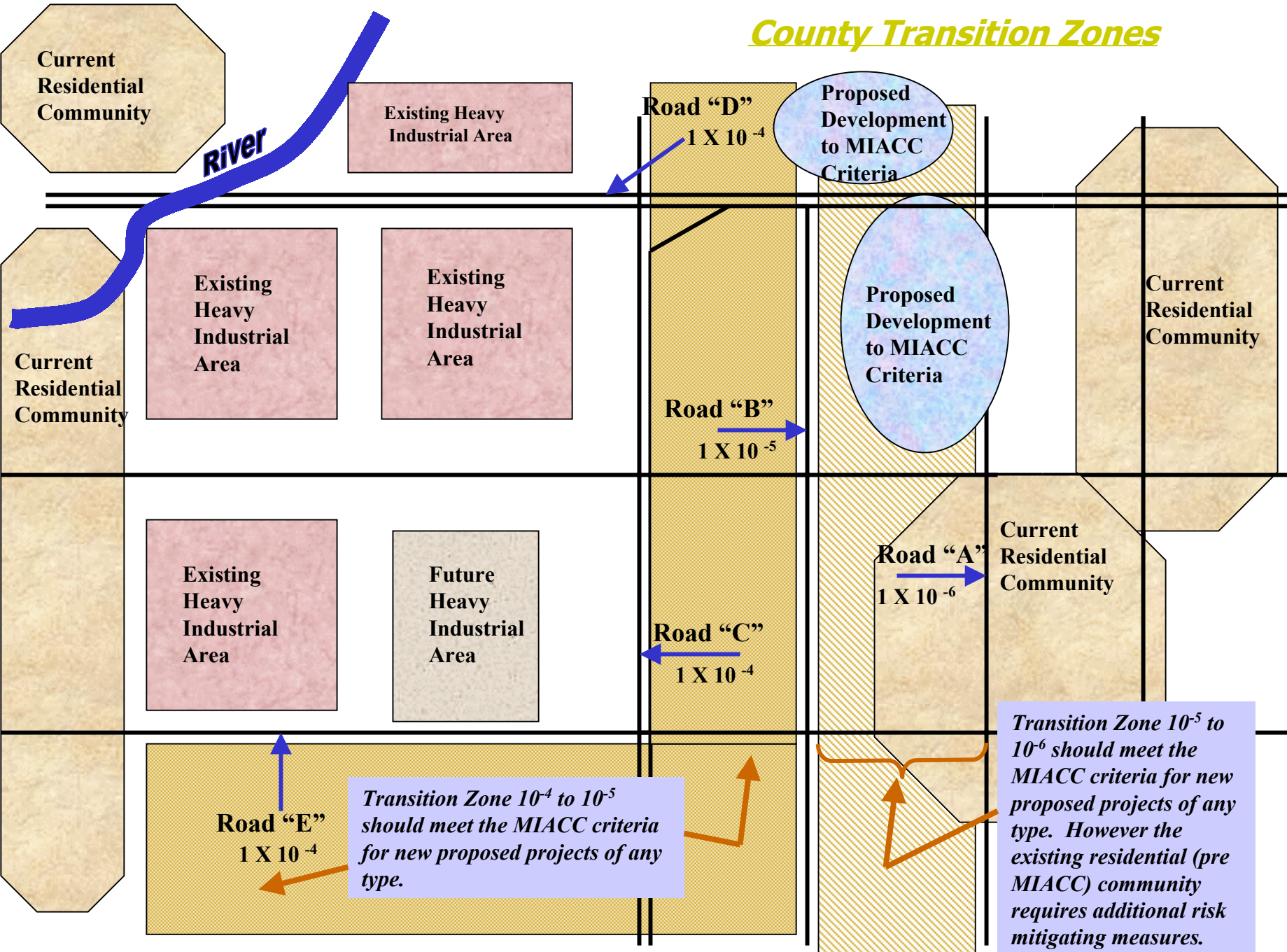


IN REALITY HOW DOES
THIS
MUNICIPALITY INTEND TO
MAKE
SENSE OF THIS?

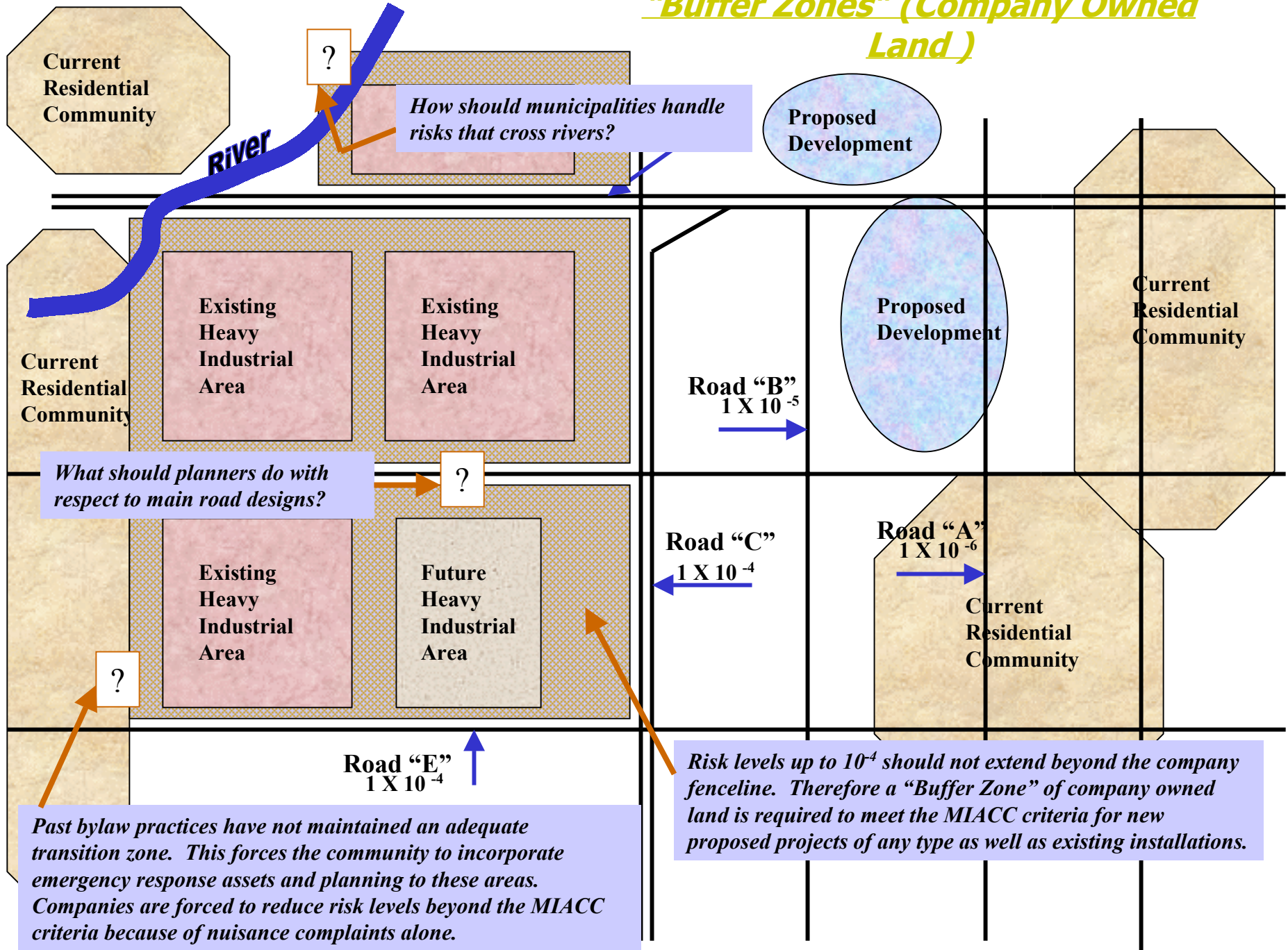
Suggested Risk Based Land Use Criteria



County Transition Zones



"Buffer Zones" (Company Owned Land)



Land Use Zoning Criteria

Buffer Zone:

- land owned by the company with the hazardous installation
- the risk cannot exceed 1×10^{-4} at the fenceline
- opportunity to provide pleasing transition of scenery
- municipalities regulate in terms of set back requirements

Municipality Transition Zone (1×10^{-4} to 1×10^{-5}):

- land owned by the municipality and for use as light industry locations, open spaces, recreational usage, transportation corridors, etc.
- For planning use 10 - 10/20 equivalent people per hectare per year is the density for the zone.

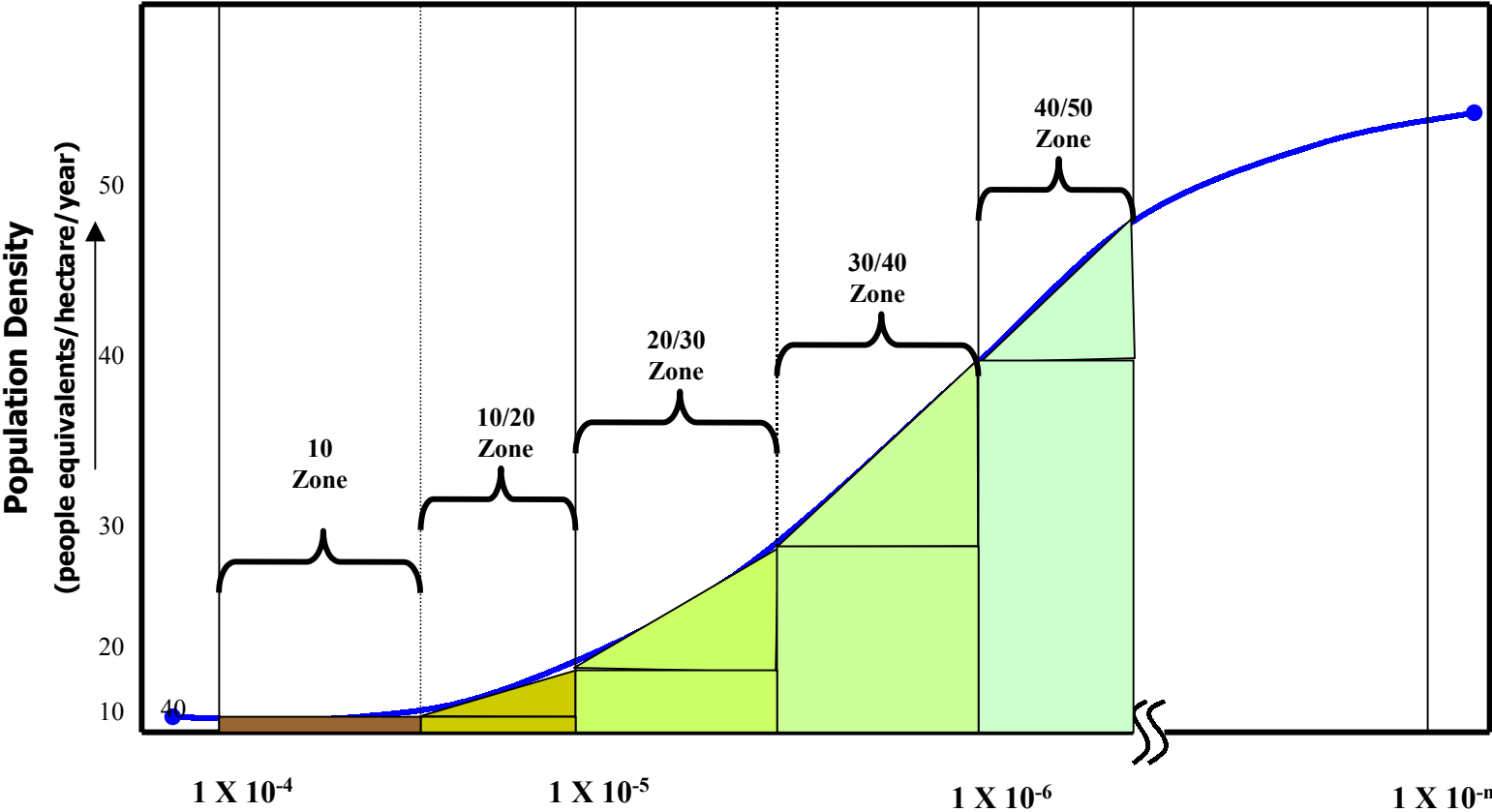
Municipality Transition Zone (1×10^{-5} to 1×10^{-6}):

- Commercial, office usage. Possible low density residential use at far end of the zone.
- For planning purposes this zone is broken into 20/30 and 30/40 people equivalents per hectare per year.

A "GRADIENT APPROACH"

Density - versus- Distance from Risk Source

MIACC Criteria



Individual Risk of a Fatality due to an Industrial Incident

A "GRADIENT APPROACH"

Density - versus- Distance from Risk Source (MIACC Criteria)

10 Zone:

10 people equivalents per hectare / year

open spaces, medium industrial, transportation utility corridors, minimum assemblies of people, no residential,.....

10/20 Zone:

10 - 20 people equivalents per hectare / year

manufacturing, warehousing, minimum assemblies of people, no residential

20/30 Zone:

20 - 30 people equivalents per hectare / year

warehousing, office, some commercial, no residential, no schools, no hospitals,

30/40 Zone:

30 - 40 people equivalents per hectare / year

office, commercial, small & medium retail, no residential, no schools, no hospitals,

40/50 Zone:

40 - 50 people equivalents per hectare / year

most any activity, possible some discretionary

Land Use Planning Concerns

- ❑ The municipal politician is overwhelmed by developer pressure with little to no guidelines or regulations to assist with risk based land use planning.
- ❑ Priorities are on “growth” and “services at low cost”.
- ❑ Quality of life is increasing in priority for residents. Nuisance factors are an issue for municipalities as well as industry.
- ❑ Communities exist with unacceptable risk levels as risks were not known at the time as they are now. Once a hazard is known, ethically it is required to inform the public and incorporate acceptable and reasonable actions to reduce the risk where practicable.
- ❑ Administrators are not familiar with the concepts of risk and application to their communities, yet they will make decisions with respect to developer requests. They need requirements and guidelines to work from.
- ❑ There will always be the “borderline” request which could set precedent if the administrator is not vigilant. These choices serve to defeat the procedures and weaken the regulations.

Land Use Planning Concerns (cont'd)

- ❑ Community involvement with respect to ongoing risk communications activities is not happening.
- ❑ Companies (including developers) are not required to carry out risk assessments and provide the information.
- ❑ It is difficult for developers to do risk assessments when they do not have the details around existing risks.
- ❑ Risk assessments are not reviewed and revised if necessary on a regular cycle
- ❑ Environmental Impact Assessments (EIA's) are felt to cover the concerns around risk in many people's minds. But they do not.
- ❑ Managing change to new knowledge needs to fit into the process. (e.g. exposure level values to some hazardous chemicals have been lowered significantly in some cases).
- ❑ Decision making processes for management and administrative choices around risk based planning are not readily available.

Risk Based Land Use Bylaws - Recommendations

- Provincial regulations to guide municipal planning activities around risk based approaches are needed. The municipal politician needs this kind of support to counter developer & community pressure.
- Some credible body needs to push municipal and provincial governments to apply the MIACC guidelines for acceptable levels of risk.
- Develop clear boundary lines between zones. The administrator is not an expert on risk assessment. Simplify and be clear. *A blend of prescriptive and performance based criteria is needed. Set out clearly what is permitted (prescriptive), what is prohibited (prescriptive), and what is discretionary (performance, based on risk assessment).*
- Develop structured processes for handling proposed development (new or changes to existing facilities). The process should be clear in expectations with more senior management involvement when needed. (E.g. the HSE *"risk criteria for land use planning in the vicinity of major industrial hazards"* - 1989)

Risk Based Land Use Bylaws - Recommendations

- Require businesses to develop risk assessments (using approved methods) for existing facilities. And to develop plans to comply with the MIACC guideline.
- Develop a registry for risk assessments for industry and developers alike. Require a review and update of these risk assessments on an agreed upon cycle.
- Set up as system to review regulatory and hazard research data in order to remain current with the ability to make smooth changes.

Risk Based Land Use Bylaws - Recommendations

- As different businesses are found to be discretionary the real questions come down to:
 - people's vulnerabilities (aged, young, disabled, under the influence, etc.)
 - population density
 - building codes
 - possible emergency response
 - nuisance factors
 - is there a residential component to the facility
 - just plain don't want it.

Introduction to Risk Based Land use Planning

The Solution:

- ❑ A balanced approach to allow all parties to participate.
- ❑ Provincial direction or even legislation. Provinces have not recognized the risk concept in their deliberations.
- ❑ Being able to translate risk contours into realistic distances to show clear zoning boundaries.
- ❑ To define “buffer zones” (company owned land) and “transition zones” (municipality owned land) into law, based on risk.
- ❑ Decision-making criteria and processes to evaluate all industry and developer projects in terms of risk to the community.
- ❑ Incorporating nuisance issues in terms of acceptable levels of risk.
- ❑ For the CSChE-PSM Division to press the case.

The LAST
SLIDE