

# CHAPTER 6

## Density Measures and Built Form

### INTRODUCTION

6.1 This chapter considers the effect that different approaches to the measurement and specification of density have on the form of new residential development.

6.2 The research has tested different approaches to the measurement of density against a theoretical development model and reviewed the impact of density measures on the built form of a variety of recent developments drawn from our sample of authorities.



"Executive" Detached House in Plymouth

#### The research findings presented in this chapter show that:

- current density measures (dwellings/area or habitable rooms/area) are ineffective in defining built form or the amount of development on site;
- specify density in terms of dwellings/area and habitable rooms/area will tend to generate different dwelling mixes;
- existing planning standards which are used to define the amount of development, tend to limit the variety of built form;
- provision for car parking can significantly affect built form, the quality of the residential environment and the intensity of development;
- the amount of built area can be effectively defined by plot ratios;
- plot ratio, used with appropriate planning standards, can facilitate a variety of built forms and site layouts; and
- effective control of built form requires the appropriate definition of net site/net developable areas.



Terraced Housing in Sunderland



High Density Flats in Swindon

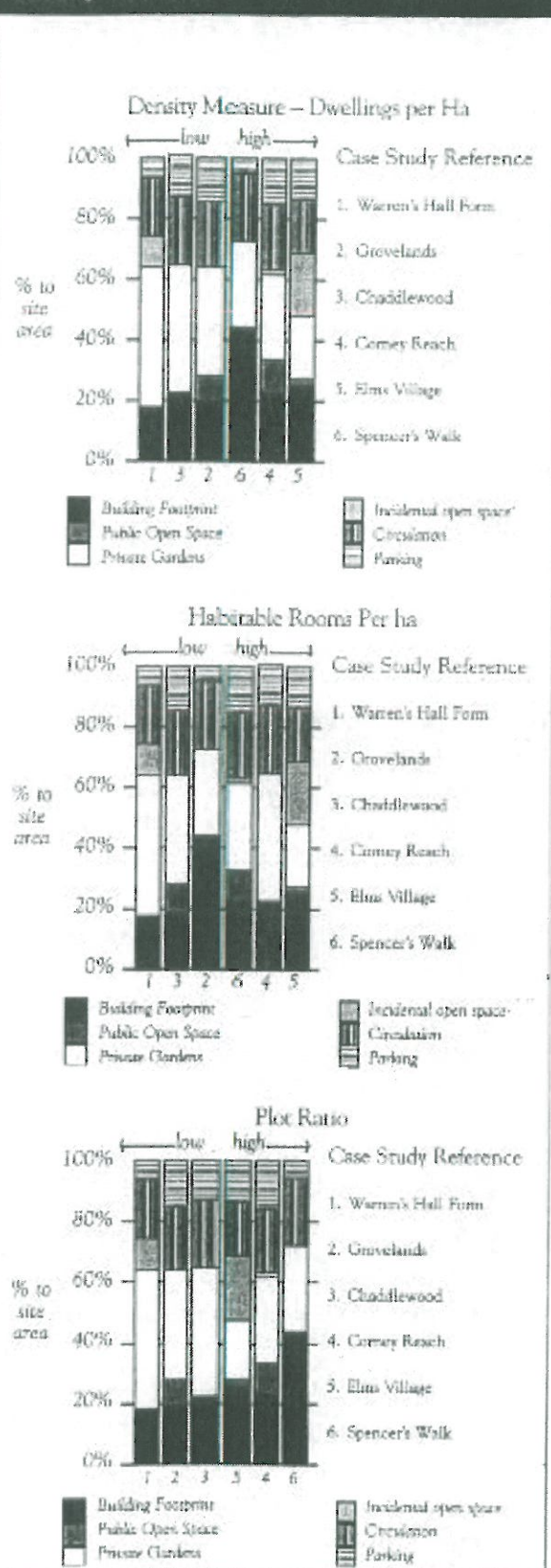
**CURRENT APPROACHES TO THE MEASUREMENT OF DENSITY ARE INEFFECTIVE IN DEFINING BUILT FORM OR BUILT AREA**

6.3 The review of current practice shows that dwellings/area and habitable rooms/area are the density measures most frequently used by English planning authorities. However, the analysis of six case study schemes (shown opposite) shows that there is no consistent relationship between density standards expressed in habitable rooms per hectare and those expressed in dwellings per hectare in terms of their built form components i.e. the proportion of the site given over to different functions. Details of the six case study schemes can be found at the end of our review of current practice.

6.4 The bar charts show the percentage of each site occupied by building footprint, private gardens, parking, circulation and open space and ranks the six schemes according to density from left to right. The diagrams show that the sequence in which the case study schemes are ranked by density varies according to how density is being measured i.e. in dwellings, habitable rooms or as plot ratio.

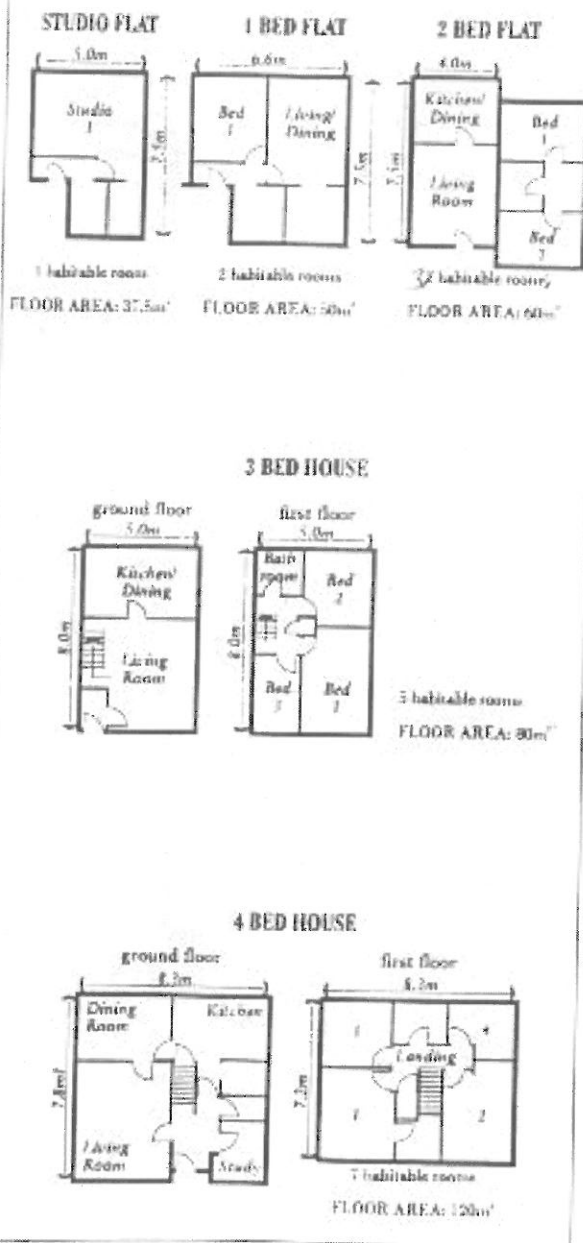
6.5 The diagrams show that, in terms of predicting the percentage of site coverage only the plot ratio approach ranks the schemes in the order that the density measure would imply. Both the dwellings and habitable rooms measures show considerable variability and neither measure consistently relates to either building footprint, the amount of development or the provision of amenity space.

**Analysis of built-form components: 6 case study schemes ranked according to different density measures**



6.6 In large measure this lack of predictability and consistency results from the fact that the average size of dwellings and average area per habitable room can vary substantially (by times) depending on the dwelling mix (family houses or small flats). The floor plans below illustrate the lack of consistent relationships between floor areas and the number of habitable rooms.

Floor areas and area/habitable rooms varies between different dwelling types



**SPECIFYING DENSITY IN TERMS OF DWELLINGS AND HABITABLE ROOMS/AREA WILL TEND TO GENERATE DIFFERENT DWELLING MIXES**

6.7 The measures of dwelling/area and habitable rooms/area will tend to have different effects. By defining the maximum number of dwellings, developers are encouraged to build the largest dwellings possible (i.e. large family houses) on a given site up to the maximum permitted density.

6.8 Conversely, by defining the maximum number of habitable rooms, developers are encouraged to build more smaller units (i.e. one bed or studio flats) to provide the largest development area per habitable room. In either case (subject to local market and site conditions) the developers interpretation of the density standard will seek to achieve the maximum amount of building floorspace.



Density as dwelling (20 dw/Ha) encourages largest dwellings possible. Thorpe Astley, Leicester



Density as per habitable room/ares (260 habitable rooms/Ha). Encourages maximum number of smaller dwellings.



Planning standards lead to regular urban forms

### APPLICATION OF GENERAL PLANNING STANDARDS TENDS TO LIMIT THE VARIETY OF BUILT FORM IN NEW DEVELOPMENTS

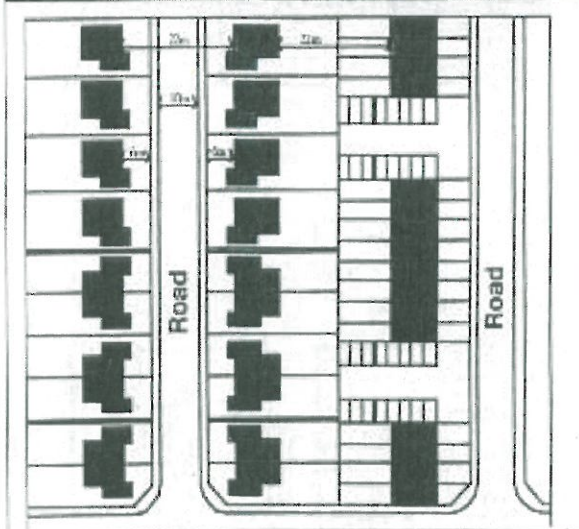
6.9 Recognising the limitations of dwellings and habitable rooms as density measures in controlling built form, planning authorities apply a range of separate planning standards, relating to aspects such as overlooking distances, minimum garden size, parking standards, public open space provision, and dwelling mix.

6.10 Applied together these standards do provide a more effective control system than dwelling or habitable room density measures in isolation. But, standards vary considerably between planning authorities and there appears to be little understanding of the effects that they have on built form and the quality of the resulting environment.

6.11 General planning standards, such as overlooking distances (22m between facing windows) and garden sizes (50 sq m per family dwelling), are inflexible and tend to limit opportunities to create variety in residential developments.

6.12 These standards can result in uniform "track" housing, along road layouts designed primarily for road safety without consideration of urban design quality. A feature of this form of development is that the built area is restricted to strips of buildings with roads centred between the buildings. In recent years some local authorities have attempted to overcome this inflexibility by using design guides to encourage variety of urban forms and street patterns. The "Essex Design Guide" pioneered this approach but this still does not effectively control the amount of built development. Planning standards lead to regular urban forms

#### How planning standards can result in regular built form



## CAR PARKING STANDARDS HAVE A SIGNIFICANT EFFECT ON BUILT FORM AND THE QUALITY OF THE RESIDENTIAL ENVIRONMENT

6.14 Parking standards vary considerably between planning authorities. Some are encouraging greater off-street/on-plot provision, while others are seeking to limit parking provision in recognition of its impact on the street scene and in relation to public transport accessibility.

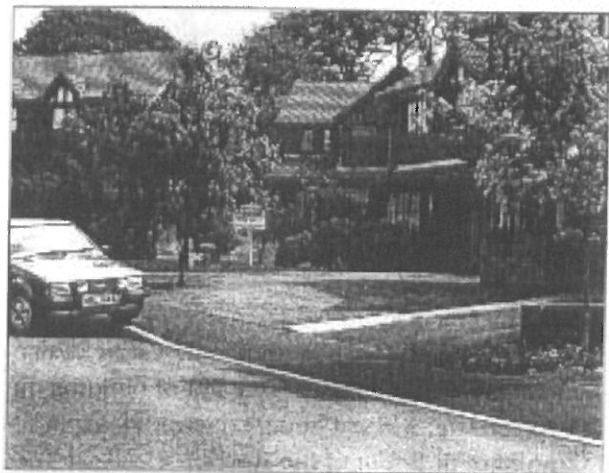
6.15 Parking standards exert a significant influence on the form of residential development, its environmental quality, and the intensity with which sites can be developed. In terms of environmental quality for example, doubling the parking standard from 1.5 to 3.0 spaces per average dwelling unit would reduce the available "green" landscape area by about 20%, thus significantly altering the visual character in terms of the balance between "hard" and "soft" elements.

6.16 Different arrangements of parking (on-plot, lay-by, etc) also require different amounts of site area and can significantly alter the perception of the impact of cars in the visual environment.

6.17 Parking standards can also influence the amount and type of development which can be accommodated on a given site. Increasing the car parking standard will tend to increase the area required for car parking and therefore decrease the area available for buildings and open space. Depending on the market, and how the standards are specified (i.e. related to units, floor area or habitable rooms), this can variously lead to smaller gardens, higher dwellings, or the use of integral garages.



High parking standards reduce the frontage available for landscaping



Lower parking standards increase the opportunities for landscaping frontage



Roads, footpaths and parking can dominate the residential environment and require a high proportion of the site area

### **THE AMOUNT OF BUILT AREA CAN BE EFFECTIVELY DEFINED BY PLOT RATIOS.**

6.18 The amount of development on a site can be directly determined by applying spatial density standards such as plot ratios. This is widely used in North America and in continental Europe (see Chapter 3).

6.19 Plot ratio is also capable of wider application to most development types, whereas dwellings and habitable rooms are only applicable to residential developments. Plot ratio is therefore a useful tool for mixed use developments.

6.20 Plot ratio expresses the total amount of floorspace in relation (proportionally) to the site area. It can have a number of advantages over dwellings, habitable rooms and planning standards in predicting and controlling built form, in particular:

- plot ratios can exactly define the built area/volume;
- plot ratios can facilitate more innovative design solutions by defining the amount of building on a given site, without being prescriptive about the form or layout of the space;
- plot ratio is applicable to all types of development and therefore can be useful in respect of mixed-use developments; and
- plot ratio is effective at all density levels, whereas habitable rooms, and more particularly dwellings, become increasingly ineffective as density increases.

### **PLOT RATIOS NEED TO BE USED IN CONJUNCTION WITH EFFECTIVE PLANNING STANDARDS**

6.21 Plot ratios determine the maximum building floor space area or volume on a given site area, but on its own cannot define built form. The same area or volume can be distributed on a site in different ways to generate very different environments. This can range from larger site coverage of low

bungalows or patio houses, through to high rise tower blocks.

6.22 Other factors therefore have to be applied along side plot ratios in order to give a more qualitative definition to the built form. The most important standards govern Building Height/Site Coverage.

### **BUILDING HEIGHT/SITE COVERAGE**

- Specifying the maximum/minimum building height or number of storeys above ground.
- Specifying the maximum site coverage or "footprint" of the buildings.

6.23 A second tier of standards can be introduced independently from density standards to specify qualitative design aspects such as:

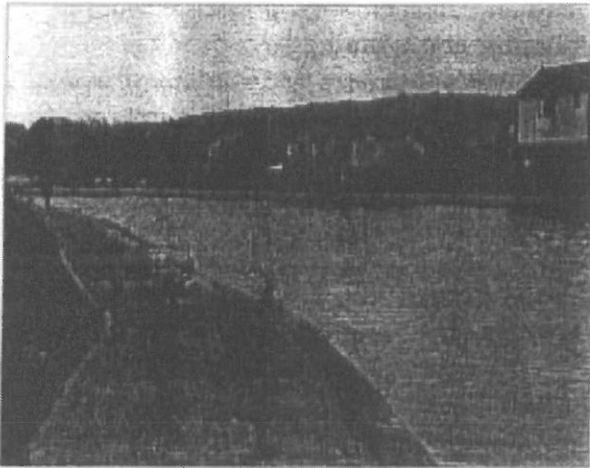
- **Open Space**
  - Amount of shared public open space
  - Amount of private amenity space (garden areas)
  - Amount of roadway and car parking
- Distance between buildings.
- **Building Type**
  - Dwelling mix
  - Tenure (private or communal ownership)
  - Minimum space standards for dwellings

### **EFFECTIVE CONTROL OF BUILT FORM REQUIRES THE APPROPRIATE DEFINITION OF NET SITE AREAS**

6.24 As Chapter 8 demonstrates, for any density measure to be effective it must be applied to an appropriately-defined net site area.

6.25 Sites vary due to local site conditions (shape, slope, etc.) and site features (water, landscape area, etc.), and these need to be excluded so that specified density levels are matched to the correct site area (see Chapter 8).

6.26 The benefits of using appropriately defined site areas is that it can preserve open space, landscape and other site features from development, as well as maintaining forms across different adjacent sites.



Effective site densities can be distorted by including adjoining areas of landscaping, canals, etc

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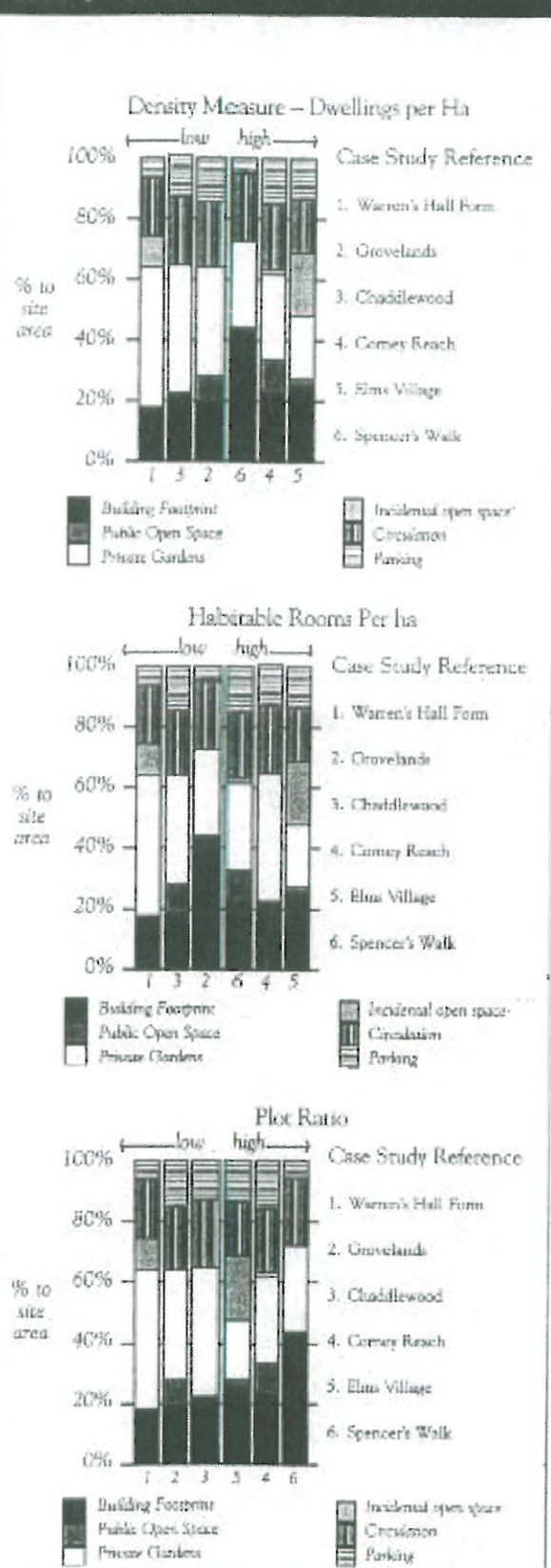
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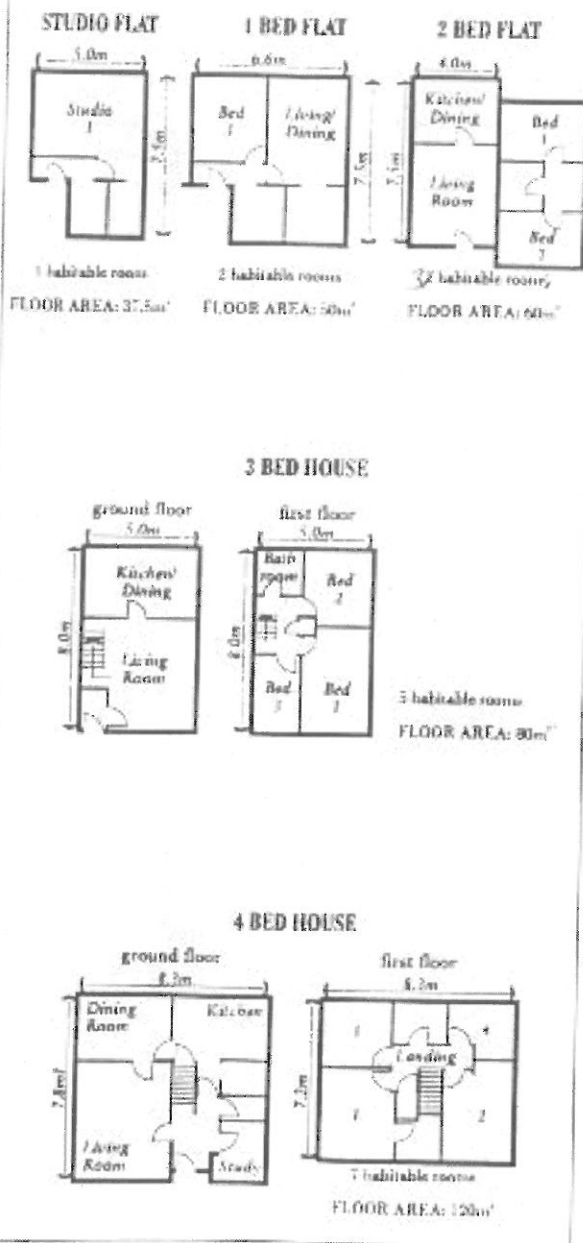
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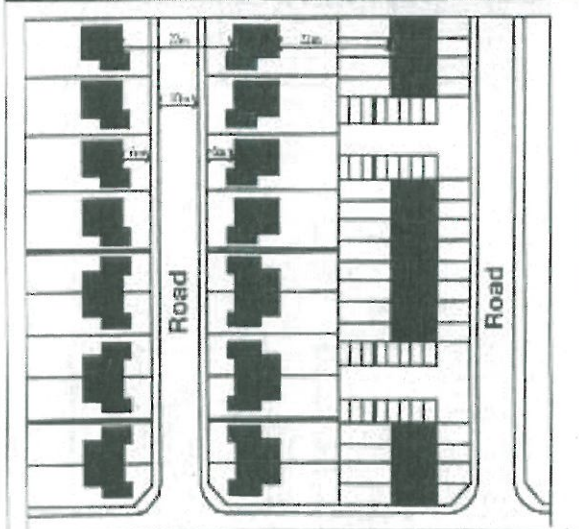
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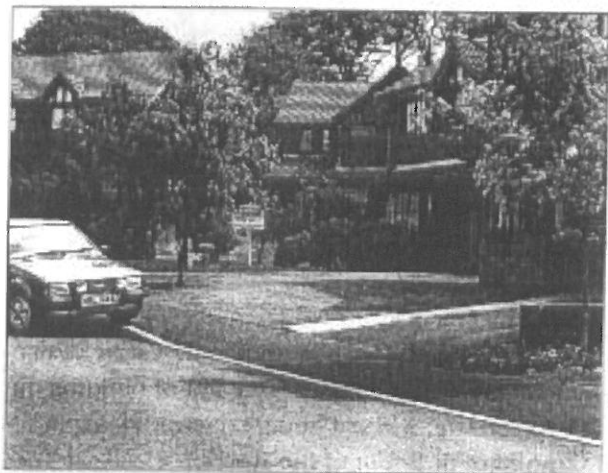
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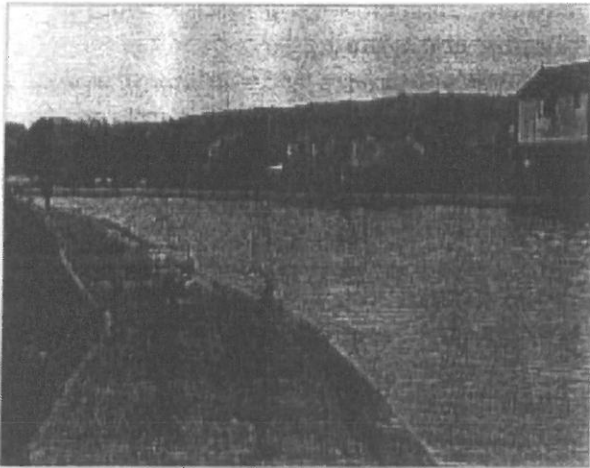
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