

Feelings of Anxiety and Environmental Design

An assessment of certain emotional and functional aspects of a subway for pedestrians and cyclists 

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This inquiry) was made at the request of the municipal planning office of The Hague, because of the existence of strong feelings of anxiety about crime on the part of the residents.*

The results indicate that feelings of anxiety occur mainly among particular groups like women and older people. Anxiety is not caused primarily by the real crime rate, but is merely a result of the general feeling of discomfort about increasing criminality and the effects of certain features of the environment.

Recommendations have been made to create a greater sense of security by making changes in the physical environment.

Introduction

It would appear from the daily press as well as from research that there is an increasing fear of violence in cities. According to an inquiry made among Dutch people on the social climate 70% of respondents in the three large cities of Amsterdam, The Hague and Rotterdam, stay at home at night for this reason (ref. 1).

Anxiety may be related to the widely-held notion of increasing criminality.

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Among other factors modern ideas concerning urban planning are seen as having contributed to the high crime rate, e.g. because of the large scale and the lack of complexity in many new residential areas. Such solutions to traffic problems as subways and multi-storey car-parks are perceived as unsafe places. Some authors even use the term "criminal architecture" (ref. 2,3).

In The Hague we had the opportunity to investigate the relationship between the lay-out of the built environment and feelings of anxiety. The study was made at the request of the municipal planning office and was focussed on perceptual and functional aspects of the so-called Binckhorst tunnel (ref. 4). This subway has been designed for pedestrians, cyclists and moped riders. It is situated between the residential areas of Bezuidenhout-West and Rivierenbuurt.

The primary reason for this study was a continuous stream of complaints, especially about feelings of insecurity concerning the tunnel. These complaints formed the main subject of discussion during meetings of the residents from Bezuidenhout-West and representatives of the local Government.

The inquiry should give an answer to the following questions:

- . To what extent does the tunnel evoke feelings of insecurity, especially among residents of Bezuidenhout-West?
- . What recommendations can be made to diminish these feelings?

Procedure

In order to give an answer to these questions, interviews were held with police officers, representatives from the municipal planning office, members of the residential committee of Bezuidenhout-West and those responsible for the design of the tunnel and the rehabilitation of the surrounding neighbourhoods. In addition, an inquiry was set up among several people from Bezuidenhout-West, while about three hundred users of the tunnel were interviewed as to their opinions and suggestions for improvement. Statistics were kept on the number of people using the tunnel, at what time they did so, whether they were alone or with other people, and the means of transportation they used. In addition, observations were made concerning signs of vandalism and other environmental characteristics which might evoke feelings of anxiety.

Problem area

The Binckhorst-tunnel connects the Bezuidenhout-West neighbourhood with the town centre. Geographically Bezuidenhout-West forms part of the inner city of The Hague. It is a residential area consisting of dilapidated housing. At present there are plans to rehabilitate this area and those dwellings which were in the poorest condition have already been replaced by new housing. In the near future there will be a thousand dwellings with a population of 3000 people. The present tenants belong mainly to the lower social-economic class. Greenery, playing areas and shopping facilities are limited.



Fig. 1. Stone steps with escalators on both sides

The tunnel itself is accessible by means of escalators and stone stairs, so that the cyclists and moped riders have to get off their vehicles. Most of them use the stairs, but they also have the possibility of taking the escalator. The entrances are partly covered, mainly to protect the escalators against weather conditions. Moreover, the architect decided to accentuate the entrance by means of the roof. The width of the fixed stairs is 2×1.40 m. The cross-section of the tunnel consists of a two-way cycle path with a total width of 4.50 m and on one side - a little bit higher - a footpath of 2.50 m. The floor of the tunnel is 5.20 m below street level. The headway is 2.75 m instead of the usual 2.50 m. This is because of the length of the tunnel and the space required for two ventilation shafts. The total length, stairs included, is 168 m, of the tunnel-tube itself 124 m. At the side of the

Schenkweg there is a distinct curve in the tunnel route. The walls inside the tunnel are decorated with coloured tiles.

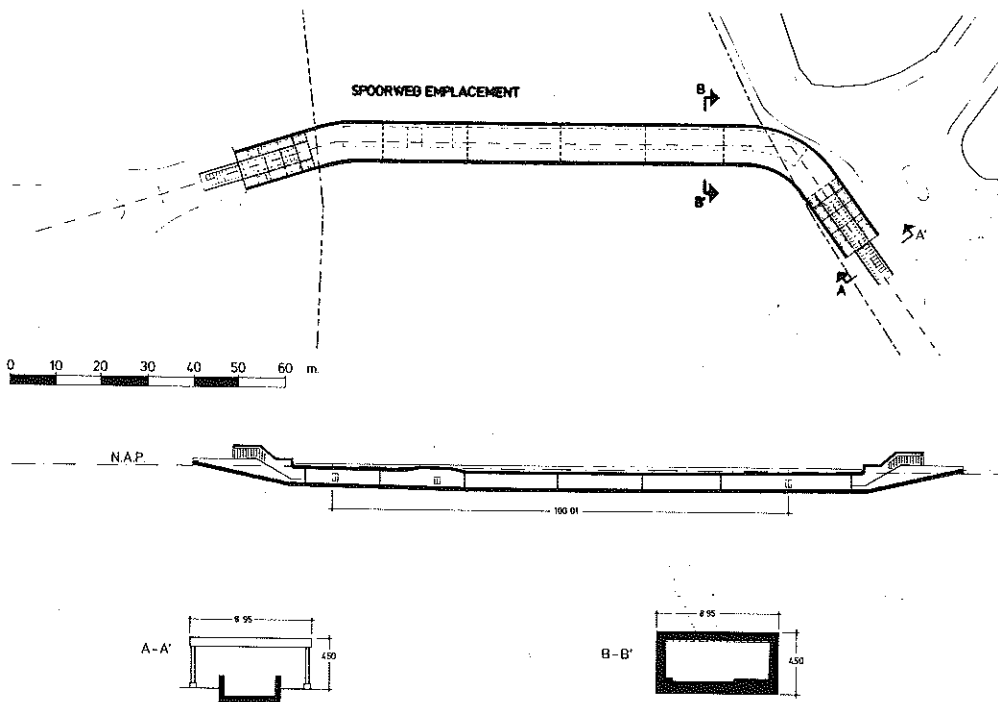


Fig. 2. Map, cross-section and longitudinal section of the tunnel

Function and use of the tunnel

Bezuidenhout-West is enclosed on all sides by large-scale traffic arteries and railways. Apart from the tunnel there are four more access routes, all of which present somewhat of a problem. For this reason the tunnel forms a very important link for those entering or leaving Bezuidenhout-West. Besides, the tunnel is of crucial importance for through-traffic. During the peak hours on working days more than two hundred people use the tunnel every quarter of an hour; 25 per cent of the users are women, on Sundays as well as on weekdays, and 60 to 70 per cent are men. All the rest are children, on Sundays somewhat more than on weekdays. Most users are cyclists (65 to 70%), 15% are moped riders and 15 to 20% are pedestrians. Although it is quieter in the evening

than by day, 25 people pass through every half hour, an average of almost one person per minute, there being very few women among them. An estimated 23000 people pass through the tunnel per week, which comes to 1.2 million per year, so there are sufficiently good reasons for a solution to the problems.

Complaints about the insecurity of the tunnel

Among the group of respondents as a whole it appears that 16% mention the problem of insecurity spontaneously. If we focus our attention on residents from Bezuidenhout-West the percentage appears to be twice as high. Obviously living in the vicinity of the tunnel affects one's perception of the subway. Besides distance there are several other factors, namely, means of transportation, the time of day when passing through, destination, age and sex of the respondents. For instance, 14% of the commuters show negative feelings against 25% of the respondents using the tunnel for other reasons such as shopping or visiting relatives. Also elderly people and women appear to have stronger feelings of anxiety compared with other categories: 28% of the elderly above 55 years complain against 15% of the people under 55 and 29% of the women interviewed against 10% of the men. These results are in accordance with observed behaviour: women in particular never use the tunnel at night alone.

Besides the investigating feelings of anxiety we examined other complaints made by tunnel-users. There may be a relationship between inadequate functioning of some aspects of the tunnel and feelings of uneasiness. It appears that 75% of the respondents have one or more complaints about various aspects of tunnel-functioning: escalators always out of order, difficult accessibility for the disabled and for mothers with prams; in addition, many people ventilate their grievances about littering, graffiti and the smell of exhaust fumes (table 1).

So, in comparison with the complaints about insecurity the number of complaints about functional aspects is notably higher. From this point of view the problem of insecurity seems of secondary importance. However, not only does the number of people complaining determine the seriousness of the problem, but particularly the nature of the complaints and their effects on the users.

Table I Complaints about the tunnel

<i>complaints</i>	<i>number of respondents</i>	<i>percentage</i>
escalators	79	27.4
getting off bike or moped	55	19.0
feelings of anxiety	48	16.5
littering	32	11.4
stone stairs	29	10.0
accessibility to the disabled	20	6.9
air conditioning	13	4.5
glass splinters	10	3.5
behaviour of users	8	2.8
slipperiness	6	2.0
draught	3	.9
crossing by cyclists and pedestrians	2	.7
bend in the tunnel route	1	.3

A sense of personal security is basic to the quality of life in a community. Anxiety in itself is unpleasant and interferes with one's mental well-being. Besides, anxiety may cause all kinds of changes in attitude and behaviour, e.g. staying home at night or refusing help to strangers for fear of victimization. Fear can make people protect themselves by fortifying their homes with watchdogs, burglar alarms, locks and bars. This defensive behaviour not only deters criminals but creates a barrier between neighbours and acquaintances too, which results in fewer social contacts and a lessening of interpersonal trust (ref. 5). Neighbours stay home rather than venture past a barking dog to borrow a cup of sugar. Other neighbours may be avoided as potentially dangerous because they keep a loaded shotgun in their homes. Thus, the fear of criminality may reduce solidarity. As we shall see this weakens informal social control, possibly contributing to increased crime rates.

Discussion

In order to offer some recommendations we must understand the causes of such feelings of anxiety. Obviously, feelings of anxiety and crime rate are correlated (although there is not a one-to-one relationship between actual

risk and anxiety about crime). High-crime areas will evoke stronger feelings of anxiety than low-crime areas. However, the local crime rate is not the only explanation. Feelings of anxiety can also be evoked by the idea people have of increasing criminality in general. The image of increasing crime may make people think that the crime rate is also increasing in their own neighbourhood. A third factor which may be mentioned is the physical environment. An eery setting may elicit feelings of uneasiness or the fear of criminal aggression. Finally feelings of discomfort about the tunnel may be a result of an overall negative feeling about the neighbourhood.

Summarizing, there are four important factors:

- . the actual local crime rate,
- . general feelings of discomfort about increasing criminality,
- . characteristics of the built environment,
- . dissatisfaction with one's own neighbourhood.

The actual crime rate in Bezuidenhout-West

Since the official opening of the tunnel (December 1974) only two offences have been reported to the police. So the actual crime rate does not seem to be very alarming. However, it is known from criminological research that not every crime will be registered (ref. 6). In our case this does not seem to be very plausible. The inquiry among the residents did not produce any new facts, except for the two who reported they were solicited once.

Apart from the tunnel and its direct environment, the Bezuidenhout-West quarter as a whole does not moreover seem to have a very great crime problem, compared with other residential areas in The Hague (table 2).

Feelings of discomfort about increasing criminality

Many people worry about the increase in crime. According to an inquiry carried out recently by the NIPO (National Institute for Public Opinion Research), 90% of the interviewees agree that an important task for the Dutch Government should be the prevention of violence and insecurity. This percentage is even higher than the percentage mentioning unemployment (85%) and the prevention of the abuse of welfare benefits (86%). Other problems appeared to be less important (less than 45%).

The common feeling that crime is increasing seems to be supported by reports in the daily newspapers. Every day there are stories about vandalism, violence on the football fields, rape and murder. However, official statistics will

give us a better insight into the crime rate and the direction in which criminality is moving. In table 3 figures are given on the numbers of crimes committed in a single decade.

Table II Number of actions by police patrol

<i>quarter</i>	<i>offence</i>	<i>total number 1977 (1976)</i>
1. Bezuidenhout-West	aggression	13 (5)
	other crimes	107 (71)
2. Bezuidenhout other parts	aggression	36 (14)
	other crimes	203 (216)
3. Rivierenbuurt	aggression	21 (13)
	other crimes	141 (112)
4. The Hague City	aggression	237 (180)
	other crimes	1479 (1347)
5. Binckhorst	aggression	1 (3)
	other crimes	100 (139)
6. The Hague (-total)	aggression	1644 (1187)
	other crimes	9222 (9339)

Table III Crime rate per 100.000 inhabitants (age 12-79)

<i>kind of crime</i>	<i>year</i>									
	1969	1970	1971	1972	1973	1974	1975	1976	1977	
Penal code	1840	2019	2422	2753	2950	3566	3537	3740	4106	
. aggressive crimes, incl.:	226	238	264	283	314	365	398	463	542	
mistreatment	80	77	79	82	90	83	78	96	98	
vandalism	91	95	121	137	155	215	251	291	365	
. sexual crimes	89	75	80	69	61	67	52	57	54	
. crimes against property	1507	1690	2058	2383	2558	3111	3065	3196	3468	

Source: *Maandstatistiek Politie en Justitie*; June 1978

(*Monthly Statistics Police and Justice Department*)

First we should like to state that one cannot speak about an increasing crime rate *in general*. The total crime rate is the sum total of very different - severe and less severe - misdemeanours. Some forms of crime increase and

others do not. But those which are relevant for our research in Bezuidenhout-West show a clear increase, especially those related to public violence and vandalism.

We can indeed conclude that the general feeling of increasing criminality is supported by the facts.

Effects of the built environment

Some places are more likely to evoke feelings of anxiety than others. In particular, poorly illuminated and poorly maintained areas may cause feelings of uneasiness. Such places indicate inadequate social control, both formal (police control) and informal (the presence of people who care about their environment).

Above all the actual or felt presence of people who can see and can hear what's going on, who care about their environment and feel responsible for it, resulting in the expectation that they will actually help if necessary, is very important in creating a sense of security. In our view, the following environmental characteristics are especially perceived by users as signals of a lack of social control:

- . inaccessibility of the area,
- . indistinctness of the area,
- . poor maintenance,
- . visible marks of vandalism,
- . absence of amenities.

A poorly accessible area thwarts the practice of formal social control. Several places are rather unaccessible to bicycles and motorcars, because of physical obstacles like stairs and fences. In such areas frequent police patrol is more difficult.

An illustration of this is the number of offences in the U.S.A. occurring inside the buildings, which is four times as large as the number of offences taking place outside. However, the number of criminals caught by the police outside the buildings is twice as large as inside the buildings (ref. 7).

With regard to the vagueness of an area we may distinguish two forms. First there can be an unclarity of function. For example unbuilt land, often used as a rubbish dump. Other places have a clear function, but this function is not clearly recognizable as such, e.g. playgrounds used as parking places. Besides functional unclarity there is also vagueness of character.

Part of the built environment is obviously private space, for instance the interior of the dwelling. Another part is completely public, such as streets and marketplaces. However, some places are ambiguous, for example galleries and staircases in apartment buildings, underground parking-areas or open green areas between blocks of flats.

Places with an unclear function and ambiguous character evoke the feeling of being in a kind of no-man's land. This feeling will also be elicited by signs of destruction and by an atmosphere of dereliction and neglect. Poor maintenance symbolizes a lack of personal involvement on the part of residents or the Government. On the contrary, a well-preserved area is 'under control'; it is owned by somebody and one cannot always have one's way. It will be perceived as a habitat, a place where people live who regard it as their own territory.

Several investigators (ref. 8) have shown that poorly maintained places evoke vandalism not only more easily but also more often. A poorly-maintained area has a negative effect on the notion of norms and rules so that people are inclined to become indifferent to their environment and leave litter around (ref. 9).

Vandalism in itself refers in a very direct way to real criminal activities, against property, it is true, but mild forms of criminality can easily cause a fear of serious crimes against people.

Finally the lack of adequate amenities affects people's behaviour. A lack of activities means the absence of people. The presence of people - at all hours - reinforces the feeling of security. An environment very often lacks people. Many places are desolated, especially at night. The impression of desolation is often strengthened by the lack of visual control.

For instance, a street with warehouses on one side and an open, unbuilt area on the other lacks the presence of windows with people living behind and looking outside now and then again.

Jane Jacobs (ref. 10) has put it this way: 'such streets have no eyes'. According to her a safe place should have attractive points in order to encourage people to make use of it. Besides, the presence of people has a positive effect in attracting other people.

Until now we discussed the relationship between environmental characteristics and the *feeling* of existing social control. The *actual* presence of informal social control is a matter of personal involvement by the inhabitants and

social cohesion within a particular community. In a community with a strong social structure the members are more likely to offer help or interfere if necessary. Also they will be less inclined to norm evasion. A strong social structure of the group leads to a clear system of values. A member of such a group knows the rules and is aware of what is right or wrong. These communities are therefore less vulnerable to crime (the concept of vulnerability refers to the probability of becoming a victim but also that of becoming a criminal). Whether a strong social structure will develop depends not only on social-cultural characteristics like education, income or lifestyle, but also on the arrangement of the physical environment. A pleasant place with attractive houses and adequate amenities can ensure that people are less inclined to move so that a stable social structure can easily develop.

From criminological studies it is known that high crime rates and social problems arise especially in the densely populated central areas of the cities. There is a decrease in the crime rate with an increasing distance from the town centre (ref. 11).

Residential areas located in the vicinity of a city centre are often described as zones of transition. There is mixed land-use, concentration of industrial activities and low-cost, often poorly-kept rented houses in a derelict environment. Such areas are characterised by instability and mobility. In regions with a high degree of mobility and an unstable population stable social relationships can hardly develop. Moreover, there is a continuous turnover of people with different attitudes, so that the rules of the group can hardly be established.

Let us return now to the subject of our research. What characteristics of the subway and its surroundings can lead to feelings of anxiety? Coming from Bezuidenhout-West the first impression the passer-by receives from the tunnel and the access area is one of dereliction: nailed-up houses, broken name-plates of streets and badly-kept pavements. The sight of a deserted traffic area with some abandoned motor-cars and no clear indication of functions or activities evoke feelings of anonymity, a lack of attention and of responsibility. It does not suggest the presence of much of a sense of identity nor a personal sphere, which is also due to the vagueness of the spatial and functional structure of Bezuidenhout-West as a whole.

The vulnerability of the quarter to social problems and criminality forms an important aspect in the perception of the built environment, including the tunnel. Nevertheless, the subway itself shows a number of characteristics which may evoke feelings of insecurity in the inhabitants.

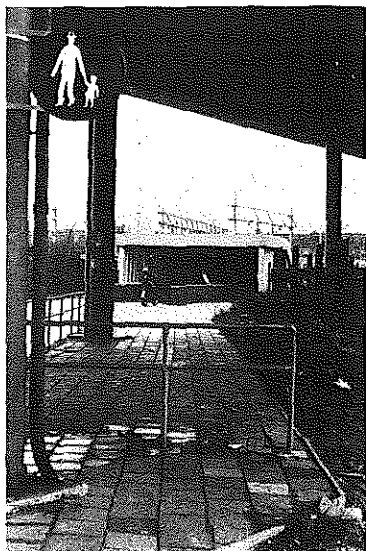


Fig. 3. Access area of the tunnel
- Rivierenbuurt

The tunnel appears as a huge, dark gap, accentuated by the steep stairs and the conspicuous roof. As a pedestrian subway it is very long, longer than tunnels usually built under canals and main roads. The uninterrupted length of the subway and the absence of visual interruptions such as skylight windows creates the feeling of being locked up. There is no opportunity to run away in case of danger. It is impossible to see the end of the tunnel which is mainly caused by the bend in its route. The access at the other end of the tunnel does not inspire confidence either: vacant land with an unclear function.

The anonymous and impersonal character of the subway and its surroundings is reinforced by the presence of litter and traces of vandalism.

Dissatisfaction with the own habitat

A fourth factor which may explain the feelings of discomfort is the dissatisfaction with the housing estate of Bezuidenhout-West.

This area is undergoing rehabilitation, which started several years ago. For years the inhabitants lived in uncertainty about the future of their homes. Many residents left the area as their houses were pulled down and no substitute accommodation was made available. Insufficient facilities, windows boarded up, the relative isolation of the area from the surrounding quarters, reinforced by the poor functioning of the tunnel, complete the gloomy image of this area. Only recently has renovation begun, so we may expect that at least some of these problems will be solved in the near future.

As a consequence of the negative image of some residential aspects some other - often less negative - aspects may also be judged unfavourably. This is the well-known phenomenon of the "halo-effect". Perhaps many of the feelings of discomfort about the tunnel will disappear when the problems in the surrounding neighbourhoods are solved. A better functioning of the tunnel, too, can diminish the feelings of anxiety.

Conclusion

Of the four factors we described to explain the feelings of anxiety, especially the environmental characteristics and the overall idea of increasing criminality seem to be of utmost importance. The actual crime rate of Bezuidenhout-West is low, particularly criminality in the tunnel and its direct environment. So the real figures cannot be regarded as an explanation. The argument that perhaps other aspects, not related to security, can also be responsible for the feelings of anxiety, is merely hypothetical and difficult to prove.

Summarizing our findings we conclude that the following aspects can explain the feelings of insecurity:

- . a general feeling of discomfort about the increasing criminality
- . the way the tunnel appears to the observer
- . insufficient accessibility of the tunnel
- . the deserted situation of the tunnel with respect to the surrounding neighbourhoods of Bezuidenhout-West and Rivierenbuurt
- . traces of vandalism, graffiti and poor maintenance
- . the character of the environment as a whole
- . the absence of people, especially at night
- . insufficient police patrol

Recommendations

It will be clear that not all feelings of anxiety can be removed. Many of the problems described are inherent to underground traffic solutions. However, to close the tunnel is not the right answer. Records show that the tunnel is used very frequently. Even at night the use is not negligible. In view of the lack of good alternatives many people would be at a severe disadvantage were the tunnel to be closed.

The recommendations made are in part directed at an improvement of the physical environment (e.g. by removing the environmental characteristics which evoke feelings of anxiety or give rise to deviant behaviour), and in part towards influencing the social environment. That is, an improvement in the social relations between the inhabitants, leading to a greater social cohesion.

For the present we propose the following recommendations:

- . improved accessibility of the tunnel
- . adequate maintenance of the tunnel and its access area
- . integration of the tunnel into the housing environment
- . rehabilitation of the Bezuidenhout-West and Rivierenbuurt neighbourhoods
- . regular police patrol, especially at night

The final recommendation is a matter of course, the other recommendations will be explained in the next paragraphs.

Improvement of accessibility

Many problems can be solved if the tunnel becomes accessible by ramps so that cyclists and moped riders can continue their way without getting off.

At the time the tunnel was built, ramps could not be realised because of spatial conditions. On the side of the Weteringkade ramps could not be realised because of the planned Rotterdamse Baan, a main road between The Hague and Rotterdam. On the side of the Schenkkade ramps were not possible in connection with the plans of designers to rehabilitate the neighbourhood. At the moment spatial conditions have changed because of a revaluation of living in the inner city. As a consequence the plans for Bezuidenhout-West and Rivierenbuurt are altered too. Besides, the planners cancelled the Rotterdamse Baan. It is therefore desirable to re-investigate the possibility of applying ramps. Apart from better functioning of the tunnel, ramps have some very important additional effects:

- . better possibilities to escape aggression
- . better accessibility for police cars
- . better accessibility for cleaning services
- . increase in use, i.e. more people and a better social control
- . a decrease of claustrophobic feelings as a result of a shorter time required to pass the tunnel

Maintenance

An environment which evokes a feeling of good upkeep and responsibility is less anonymous, so that people are less prone to throw away litter. In this connection Peter Shephard (ref. 12) mentioned the Law of Diminishing Vandalism: removing litter and marks of vandalism very frequently results in the long run not only in a decrease of littering but also - because of the evident care and involvement - in a reinforcement of feelings of security.

Improvement of the relation between residential area and tunnel

The two access areas of the tunnel are both rather isolated. There is no visible relation with the neighbourhood. A better relation can be established by a rearrangement of the transitional area, directed towards less spatial and functional vagueness. This can be done by creating recognizable, well-demarcated sub-areas with clear functions. That is to say clearly-defined differences in traffic and non-traffic areas and in public and private places. Of crucial importance is the availability of dwellings and other facilities attracting people, so that a more visible, audible and perceptible control is ensured. The ambiguous character of vacant land should be taken away by establishing clear indications as to future functions. The transitional zone at the north side of the tunnel is part of the district quarter of Bezuidenhout-West. This area is the subject of urban renewal and plans are already in various stages of development. The emphasis in the plans is laid upon the village-like character, together with a concentration of facilities in the heart of the neighbourhood.

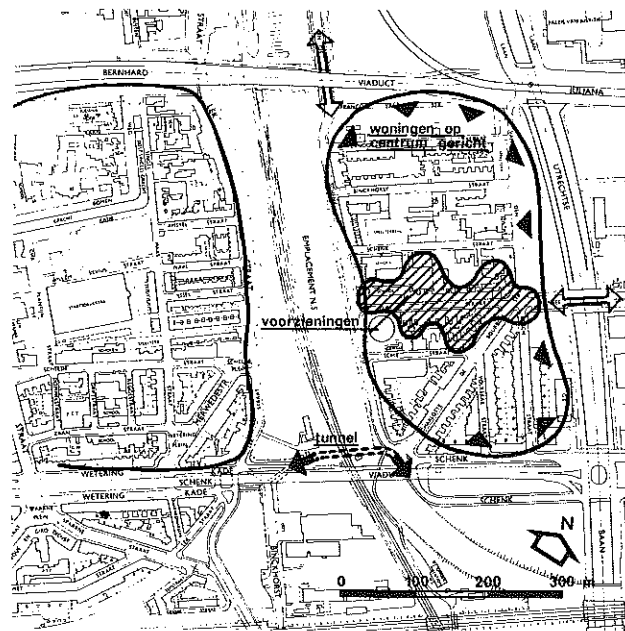


Fig. 4. Continuation of present plans keeps the tunnel isolated

The surrounding dwellings are orientated around this centre. In view of the location of the district on the arterial roads Utrechtse Baan and Prins Bernhardviaduct (figure 4) this solution is quite understandable.

in the settlement of a more or less stable population. Sufficient facilities, such as playgrounds, greenery and schools offer the possibility to develop all kinds of activities which will stimulate contacts between the residents and strengthen the involvement with their own neighbourhood.

The present community centre is a good example of such a development. Further it is important to design small and recognizable housing units in which every resident has sufficient opportunities to meet his neighbours. A strong personal involvement and identification with the neighbourhood and a sense of responsibility to help and to protect each other will - according to Jeffery (ref. 13) - lead to stronger social cohesion and also better social control.

The rehabilitation of Bezuidenhout-West started by the municipality at present is an important means of re-establishing stability and security in the district.

Follow-up research

The present study deals with a particular design project which has already been carried out. As a consequence, the possibility of offering design proposals for improvement is limited. It makes more sense to bear in mind the demands for an attractive and safe place in a very early stage of the design process. Therefore the development of guidelines for designing a safe environment is of crucial importance.

Further research is primarily focussed on the programming of design guidelines for cycle- and pedestrian subways. Attention will be paid not only to the subway itself but also to the integration of the subway into the total structure of the surrounding area. For this purpose ten tunnels have been observed and evaluated as to their functional and perceptual qualities, with an emphasis on the perception of security. Besides this study, which is concerned with tunnels, another study has been prepared on the relationship between characteristics of the built environment, feelings of anxiety and the actual crime rate. A study of literature will enable a theoretical model to be developed which forms the basis for programming guidelines for designing a more secure environment in general.

In the past few years the study of the effect of architectural design on the prevention of crime has become an important new field. Particularly important are the studies made by Oscar Newman (ref. 7, 14). He developed several new architectural design concepts that foster a more appropriate attitude by the residents towards their buildings and neighbourhood and enhance safety.

One of his basic concepts is "defensible space", by which he means "a residential environment whose physical characteristics - building layout and site plan - function to allow inhabitants themselves to become the key agents in ensuring their own security". Newman has applied his theoretical principles in practical design projects such as housing estates for different user groups, e.g. single-family houses for families with children and buildings for the elderly (ref. 14). Studies on the prevention of school vandalism by means of environmental design have been carried out by Zeisel (ref. 8) and by Pablant & Baxter (ref. 15). Jacobsen and Avi-Itzhak (ref. 16) studied a variety of social, economic and spatial characteristics of communities in an attempt to account for differences in the levels of care shown with regard to their public places.

All these studies have been made in order to make architects, municipal engineers and the like become aware of the possibilities of avoiding vandalism and other forms of norm evasion through adequate attention to environmental details and appropriate design.

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