



# Impact of comprehensive development zoning on real estate development in Hong Kong

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## Abstract

This article presents empirical tests to examine if the comprehensive development area (CDA) where the town planning is more comprehensive has relatively higher economic values than the area outside CDA. The three hypothesis are: (i) CDAs have less environmental complaints than areas outside CDA; (ii) property sales price variances in CDAs are smaller than those in areas outside CDAs; and (iii) property sales prices in CDAs are higher than those in areas outside CDAs. These findings have important implications on efforts to consider planning policy in land use decisions. © 2001 Elsevier Science Ltd. All rights reserved.

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## Introduction

Zoning is well known as a key instrument in planning regulation which is environmental regulation in its broadest sense. It is regarded at the economic level as a means to replace private planning of proprietors in their exercise of private property rights by government planners whose decisions are based on professional judgement. Even planning systems without explicit zoning regulations have implicit elements of zoning such as government delineation and restrictions of rights over land within certain spatial confines (Willhelm, 1962; Hagman, 1973).

In general, zoning has a dual character:

- (a) assigning exclusive property rights;
- (b) as a planning instrument which attenuates private property rights over the most valuable uses of land.

Zoning as a non-contractual obligation imposed by town planners was legally introduced into Hong Kong by the Town Planning Ordinance of 1939. Then in 1959, a new section 16(1)(d) was introduced to the Building (Administration) Regulations 1956 which allowed the refusal of building consent when a proposed development did not conform to the official zoning plans. As a

result, many different obligations are introduced in Hong Kong to attenuate private property rights. Most zoning acts in Hong Kong concentrate on the attenuation of private property rights. However, zoning regulations not only determine the type of use, they also regulate land and structure characteristics such as lot size, set back and building height (Pogdzinski and Sass, 1991).

It has been argued that planning makes the whole context within which development takes place less uncertain. Uncertainty about future real estate prices makes the decision to develop the land at the current time relatively less attractive (Titman, 1985). Alternatively, Neutze (1987) suggests that planning of land use helps to reduce the level of uncertainty about the form and level of development that will be appropriate and permissible and, as a result, to increase the supply and to reduce the price of land for development and redevelopment. Since most residential development in Hong Kong is high-density development, and it is irreversible, it is desirable to have careful planning on the land use. Market failure is present in the ownership and management of land in Hong Kong. Inadequacies in legislation is often responsible for failure in the land market (Macmillan, 2000). The comprehensive development area (CDA) zoning is a planning policy introduced by the Hong Kong government to impose zoning on land use. Based on this concept we would examine if

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government planning generates more benefits over private planning. Some background and basic concept of CDA is introduced in the next section.

This article focuses on two interrelated aspects of the CDA concept: (1) Does CDAs have less environmental complaints than non-CDAs? (2) Does property market in CDAs perform better than that in non-CDAs? (see Sagalyn, 1972). The article is organized as follows. The next section explains the rationale for such CDA planning system. The following section presents a detailed analysis on our working hypothesis. The last section concludes with a summary of the key findings and implications of the study.

### What is CDA zoning?

The CDA zoning was first introduced into outline zoning plans in 1976, with the key objectives to facilitate urban restructuring and to phase out incompatible land uses. Under the existing Town Planning Ordinance, the Town Planning Board (TPB) is empowered to designate an area as CDA. Development within a CDA zone must obtain planning permission from the TPB, and development proposals will have to be shown on a master layout plan (MLP) for the approval of the TPB to ensure sufficient planning control and comprehensive development.<sup>1</sup> As at the end of the first quarter of 2000, there was a total of 167 sites (about 830 ha) on statutory plans designated as CDA or OU(CRA).<sup>2</sup> About half of the sites were designated from private sector's initiatives.

Particularly, the CDA zoning can be applied to existing street blocks with the intention to ensure redevelopment on a comprehensive basis and avoid the hazard 'piecemeal redevelopment' when subdivision and combination were unrestricted. When a street block is zoned CDA, an individual tenant or sub-tenant can no longer redevelop his or her land through subdivision or in situ, and must get an agreement with each and every other tenant and sub-tenant for a planning scheme, namely a master layout plan, for the whole street block.<sup>3</sup> If this scheme is approved by the TPB, the proposed redevelopment may proceed. Imposing CDA zoning on existing leasehold land attenuates the rights of landowners to freely subdivide or combine property for the

most profitable purpose. Transaction costs would be expended by landowners in their attempts to negate or comply with the CDA zoning.

In new development areas, especially in new towns, the same is achieved by prior restriction on subdivision of street blocks via lease conditions when they are allocated. In this situation, the administrative restriction of subdivision is part of the civil contract between the government and the property owners and does not constitute an infringement of rights.

The CDA concept has three major benefits from the planners' point of view (Booth, 1996; Listokin, 1974; Weaver and Babcock, 1979). Firstly, CDA sites can achieve the maximal plot ratios. Secondly, it will achieve a better designed layout and block disposition and provide adequate communal facilities for the development. Thirdly, the CDA concept allows economies of scale in property and environment management governed by the deed of mutual covenant.

Basically CDA zoning aims to achieve the following objectives:

- (a) facilitate urban renewal/restructuring and the phasing out of incompatible and non-conforming uses, thereby improving the environment,
- (b) provide opportunities for site amalgamation and restructuring of road patterns and ensure integration of various land uses and infrastructure development, thereby optimising the development potential of the site,
- (c) provide means for achieving co-ordinated development in areas subject to development constraints or interface problems,
- (d) ensure appropriate control on the overall scale and design of development in areas of high landscape and amenity value and in locations with special design or historical significance.

In determining whether the CDA zoning is suitable for a particular site, such factors as planning intention, land status, and development constraints, including prospect for implementation would be taken into considerations. However, CDA is only designated when there are no better alternatives to achieve the planning objectives for the area concerned.

### Rationale for CDA planning

Since Hong Kong population grew very rapidly during the postwar periods, the Building Ordinance was relaxed in 1956, allowing the development of high-rise blocks on land. Consequently, intense redevelopment activity has increased drastically. Nowadays, Hong Kong is a city characterized by high-rise buildings and intensive use of the scarce land resource. The current system of ownership in high-rise property

<sup>1</sup>The approved master layout plan will be deposited at the Land Registry and the Department's Planning Enquiry Counter for public inspection.

<sup>2</sup>ou(CRA) refers to Other Specified Uses annotated comprehensive redevelopment area zoning.

<sup>3</sup>In Hong Kong, most residents live in multi-storey buildings in which an owner of a flat is considered to be a sub-lessee of the land lease. A developer who wants to redevelop a land parcel and does not hold the lease must first purchase the land rights from hundreds of sub-lessees. However, some may refuse the offer and hold up the entire redevelopment project.

is that of tenancy in common based on a deeds registration system with land granted on lease from the Government. Hong Kong adopts a leasehold system. The lease is actually interpreted as a development right. Thus, leases sold at public auction have included restrictions on land uses that conform to existing zoning plans. Based on these restrictions, the developers can calculate their bids. However, the division of a multi-ownership of buildings imposes constraint on urban redevelopment, since it is very difficult to acquire all interests in a redevelopment site of any significance. Thus in old urban areas, redevelopment has been restricted to sporadic high-rise projects on small sites, commonly called pencil development. Such pencil development often causes development inefficiency (see Fig. 1).

About 80% of the land in Hong Kong is hilly; development costs are expensive. The built up area constitutes less than 20% of all land (Tse and Ganesan, 1999). Hence, Hong Kong has been planned and developed on the principle of high-density. Since land in Hong Kong is a scarce resource, high density is the only sensible and the best form of development. Compared to the low-density development, high-density pattern makes the most efficient use of the infrastructure provided, reducing waste by using up all the capacities of the service systems. This means that high-density development reduces the “friction of space”.

Other than well-planned districts, high-density development requires that many people living nearby have to compete for the use of whatever facilities that are provided. However, such districts are often fully and

intensively developed old urban areas so that, even if other resources are available, there is insufficient land on which the necessary additional facilities can be provided. In a low-density area, different uses can be accommodated in separate sites. Usually, each site is only used for one building and for one purpose. If the city has been planned, the different uses are located in clearly defined compartments of land uses so that incompatible uses are never located in such close proximity and in such wrong locations relative to each other as to cause problems to each other.

However, in high-density development areas, especially old urban districts, many uses are piled on top of one another in the same buildings or located in buildings in close proximity. There is a very high degree of intermixing of space users, many of which may not be compatible to one another and some are even hazardous to others (see Fig. 1). Thus the living environment is adversely affected.

In order that a high-density development area can provide an attractive townscape and the necessary facilities at the appropriate locations, it must be well planned and must be implemented through large-scale comprehensive development schemes. This is important for both new development and redevelopment of old districts. Consideration of such comprehensive development schemes includes urban design integration between all built structures inside the CDA as well as between CDA and the overall townscape, standards of provision and locational factors of community and recreational facilities, need of infrastructure, effects of physical development on human behaviors, etc (see Fig. 2).

In order to closely monitor the implementation progress, the Town Planning Board agreed in 1998 that more frequent reviews should be undertaken for the



Fig. 1. High-density development through redevelopment without CDA zoning.



Fig. 2. Properly planned CDA high-density development.

Table 1  
Successful CDA zoning examples

Whampoa garden	The transformation of a former dockyard into a popular private residential development with ample commercial, community and open space provision
The center and the Grand Millennium Plaza in Sheung Wan	The CDA zoning has facilitated the transformation of old dilapidated urban fabrics into an attractive office environment. Opportunities were taken in this development schemes to provide two unique and spacious open spaces dedicated for public enjoyment. These landscaped and well designed open spaces bring considerable appeals to this previously drab and congested area and are the foci for commercial and business activities in the area
Discovery park	The development of Discovery Park at the former China Dyeing Works Factory site has overcome the environmental constraints for residential development through comprehensive planning
Grand pacific views/Grand pacific heights in Siu Lam	In the rural context, these development provides a good illustration of how the CDA zoning could help transform an open storage area into a pleasant residential environment with adequate provision of infrastructure and community facilities

existing CDA zones. Upon review, the following proactive steps may be undertaken where appropriate:

- (1) to reassess the appropriateness of CDA zoning for those sites which have genuine implementation difficulties or slim chance of implementation;
- (2) to review the development parameters of the CDA sites, and where appropriate, to provide better development incentives;
- (3) to revise the zoning boundary taking account of the latest land ownership pattern, or to sub-divide CDA into smaller sites for phased development so as to facilitate early implementation of the sites; and
- (4) to rezone CDA sites upon completion of development to other appropriate zonings to better reflect their existing uses and to provide flexibility for subsequent modification of uses within the development without the need for submitting a revised master layout plan.

In some cases, longer development lead time is required to resolve complicated issues such as, land assembly problem due to fragmented ownership. The CDA zoning can achieve a significant improvement in the overall quality of the area. Some successful examples are shown in Table 1.

### Three hypothesis

From an economic perspective, the value of land resources derives from the benefits people receive from them. While other value paradigms exist, economics is useful in that it recognizes that scarcity forces choices to be made between competing resource uses, and provides a framework for evaluating the costs and benefits of resource use alternatives in monetary terms. While the economic yield can be assessed numerically in terms of gross floor area and the superior design as a result of planning can be adjudged in some other way, the benefits of CDA planning scheme in comparison with piecemeal development are more difficult to measure

quantitatively. Goodman et al. (1998, pp. 313–314) state that:

While individuals might value an environmental resource for any of several reasons, within the environmental economics literature, non-use values are widely considered to include passive use and option values. Passive use values are composed largely of existence values, wherein an individual derives satisfaction from simply knowing that a resource exists; and bequest values, wherein individuals value a resource's preservation for the benefit of future generations. Option values arise when individuals are willing to pay to have the opportunity to enjoy a resource in the future.

Moreover, the relationship between option value and use and non-use values is unclear. For the purpose of this study, three empirical tests are carried out:

**Hypothesis 1.** *CDAs have less (in terms of percentage) environmental complaints than areas outside CDA.*

Hypothesis 1 involves a direct measurement of the impact of zoning regulation upon externalities. If CDA zoning really achieves the purpose of avoiding negative externalities and integrating positive externalities, then there should be a lower incidence of environmental complaints within CDAs than in areas without CDA zoning. Hypothesis 1 can be refuted if areas outside CDA does not have higher incidence of environmental complaints than CDA.

To test Hypothesis 1, the environmental complaint data for each urban district are examined. Data on environment complaints by districts are available since 1992 and are shown in Table 2. The data required come from Environmental Protection Department, Hong Kong Census. As the environment complaint data have no exact address codification, the test can only be carried out on a probability basis. Moreover, districts vary in terms of areas and population. Therefore, the data were weighed by population size through

Table 2  
Environmental complaints for each urban district, 1992–1997<sup>a</sup>

Districts	1992	1993	1994	1995	1996	1997	Total
Tsuen Wan	127	215	230	212	395	298	1477
Kwai Tsing	154	349	322	467	1020	459	2771
Central and Western	128	209	212	245	416	459	1669
Wan Chai	101	145	142	276	635	346	1645
Eastern	139	247	236	319	527	334	1802
Southern	31	74	91	121	127	117	561
Kowloon City	137	238	218	317	574	493	1977
Kwun Tong	121	253	219	310	410	329	1642
Mong Kok	79	141	125	246	500	229	1320
Sham Shui Po	111	136	154	389	550	227	1567
Wong Tai Sin	48	77	74	89	281	206	775
Yau Tsim	52	100	86	175	345	330	1088

<sup>a</sup>Source: *Environmental Hong Kong*, Environmental Protection Department, Hong Kong Government, 1992–1998 editions.

Table 3  
Environmental complaints per person for each urban district, 1996<sup>a</sup>

Districts	Environmental complaints in 1996	Population at 1996 by-census	Environmental complaints per thousand people
Tsuen Wan	298	271,576	1.10
Kwai Tsing	459	440,807	1.04
Central and Western	459	253,383	1.81
Wan Chai	346	180,309	1.92
Eastern	334	560,200	0.60
Southern	117	257,101	0.46
Kowloon City	493	402,934	1.22
Kwun Tong	329	578,502	0.57
Mong Kok	229	170,368	1.34
Sham Shui Po	227	380,615	0.60
Wong Tai Sin	206	386,572	0.53
Yau Tsim	330	111,692	2.95

<sup>a</sup>Sources: (1) *Environmental Hong Kong*, Environmental Protection Department, Hong Kong Government, 1992–1997.

(2) *Hong Kong 1996 by-census*, Census and Statistics Department,

calibrating complaints on a per capita basis. The hypothesis is modified as:

*Residential districts with greater percentages of street blocks for residential use (in terms of areas) developed under CDA concept have less environmental complaints per person than residential districts with lower percentages.*

As the population figures for each district are only available in the census and by-census years, the by-census data of the year 1996 are used to calculate the number of environmental complaints per person. The number of environmental complaints per person for each urban district in 1996 is tabulated in Table 3.

The test results are shown in Table 4. Under this test, the above hypothesis is not refuted. Districts with more CDAs (mainly public or private housing estates) such as Southern, Wong Tai Sin, Kwun Tong and Eastern Districts have the lowest number of complaints. Yau

Table 4  
Percentage of residential land developed under the CDA concept and the number of environmental complaints per person for each urban district, 1996

Districts	Environmental complaints per thousand people	Percentage of residential land developed under the CDA concept
Yau Tsim	2.95	0
Wan Chai	1.92	0
Central and Western	1.81	2
Mong Kok	1.34	5
Kowloon City	1.22	8
Tsuen Wan	1.10	42
Kwai Tsing	1.04	51
Sham Shui Po	0.60	43
Eastern	0.60	69
Kwun Tong	0.57	78
Wong Tai Sin	0.53	82
Southern	0.46	89

Tsim, Wan Chai, Central and Western, and Mongkok Districts with no developed CDAs, have the largest numbers.

The correlation between the two variables, percentage of land developed under CDA concept ( $X$ ) and the number of environmental complaints per capita ( $Y$ ), is estimated by the linear regression:  $Y = \alpha + \beta X$ . The results are as follows:

$$Y = 1.867 - 1.762X, \quad \text{standard error} = 0.379.$$

The result is statistically significant. The negative sign of the regression coefficient  $\beta$  shows an inverse relationship between the number of environmental complaints per capita and the percentage of land developed under the CDA concept. The magnitude of the standard error of coefficient (closer to 0 than 1) shows that the result can be predicted with a fairly high degree of accuracy. The results suggest that there are less environmental

complaints in areas with more CDAs than those areas with less CDAs.

**Hypothesis 2.** *Property sales price variances in CDAs are smaller than those in areas outside CDAs.*

This test attempts to examine whether area with zoning regulations can protect private property rights better in terms of use than areas without such regulations. The intuitive reason is that the old Crown lease conditions leave unspecified the type, form and nature of uses and their architectural manifestations. Examples are the erection of advertisement signs and choice of external finishes. As such, each owner would seek to capture the rental value of such unclearly specified rights, notably those concerning orientation, view (which is convertible into rental for advertisement sign boards) and the high context of Hong Kong. This results in rent dissipation under intense competition.

By contrast, CDAs, being comprehensively planned, would be able to constrain such competition and enable an orderly allocation of rights to aspect, view and sunlight, etc. As a result, the variances in rental level and capital value of non-CDA development would generally be greater than those for CDA development. Hypothesis 2 is rejected if the price variances of CDA development are not less than those of non-CDA development.

To test Hypothesis 2, the sales prices of the residential units in developed CDAs are compared with non-CDA units in the district. Seven large CDAs of private housing estates are selected for the test and their sales prices (HK\$/m<sup>2</sup>) are compared with their respective districts (Table 5).

The price variances of each CDA and the corresponding district are also presented in Table 6. With the exception of Kornhill and Belvedere Gardens, the statistical variances of sales prices of all other CDAs are higher than those in the corresponding districts. Thus the hypothesis is rejected. Alternatively, the influence of exogenous political shocks which might have significant impacts on property rights can be controlled by dividing the time series into two parts,

namely: ‘politically stable’ and ‘politically unstable’ periods. Following this background, Hypothesis 2 is stated as:

*Property sales price variances in CDAs are smaller than those in areas outside CDAs given a politically stable investment environment.*

The politically unstable period commenced in April 1989, the prelude to the June 4 incident, and ending in December 1991 just before the economy in China regained its growth momentum in early 1992. The result is presented in Table 7. As is seen, in the two politically stable periods (January 1988–March 1989 and January 1992–March 1993), the price variances of the housing units in CDAs are generally smaller than the variances of those in their corresponding districts (the exceptions are Whampoa Garden, Belvedere Garden, and Luk Yeung Sun Tsuen in the period from January 1988 to March 1989 and Heng Fa Chuen in the period from January 1992 to March 1993). Hypothesis 2 is hence not conclusively rejected, under the period of stable political environment. The introduction of the ‘political factors’ might have complicated the situation.

**Hypothesis 3.** *Property sales prices in CDAs are higher than those in areas outside CDAs.*

Hypothesis 3 is rejected if the sales prices of housing units outside CDAs do not have lower premium than those inside CDAs. To test this hypothesis, the prices of CDA housing are compared with the district averages. We found that the prices of all CDA housing units appear to be significantly higher than the district averages. In other words, the prices of all CDA housing units are at a premium to those in their corresponding districts.

In addition, there are two observations in this study, which may lend further support to the above conclusion:

- (a) Housing units in CDAs in their infancy stages (i.e. newer CDAs) appear to have higher premium relative to non-CDA units. Particularly, there is a very high premium in 1988 for Kornhill, Heng Fa Chuen, Whampoa Garden and Belvedere Garden (the newer CDAs) but a relatively lower premium for Taikoo Shing, Mei Foo Sun Chuen and Luk Yeung Sun Tsuen (the older CDAs) in the early stage of development.
- (b) When the housing market is booming, the CDA premium tends to rise faster than house prices. However, when the housing market is in recession, the CDA premium tends to fall slower than house prices. This evidence seems to suggest that when the economy is growing, home-buyers are more willing to pay for the attributes generated from the CDA concept, but not so when the economy does not perform well.

Table 5  
Districts of comprehensive development estates

Comprehensive development estates	Districts where the estates are located
Taikoo Shing	Shau Kei Wan
Kornhill	Shau Kei Wan
Heng Fa Chuen	Chai Wan
Whampoa Garden	Hung Hom
Mei Foo Sun Chuen	Cheung Sha Wan
Belvedere Garden	Tsuen Wan
Luk Yeung Sun Tsuen	Tsuen Wan

Table 6  
Price variances of developed CDAs and their corresponding districts

Name of CDAs	Variance (thousand)			Standard deviation		
	From the means	From the quarterly moving average	From the half-yearly moving average	From the means	From the quarterly moving average	From the half-yearly moving average
Taikoo Shing	140,037	56,959	264,639	11,834	7547	16,268
Kornhill	115,745	47,116	211,116	10,758	6864	14,530
Shau Kei Wan	117,206	39,895	189,740	10,826	6316	13,775
Heng Fa Chuen	121,474	51,474	212,894	11,022	7175	14,591
Chai Wan	114,175	37,423	172,635	10,685	6117	13,129
Whampoa Garden	123,481	48,300	206,932	11,112	6950	14,385
Hung Hom	121,850	32,397	168,136	11,039	5692	12,967
Mei Foo Sun Chuen	51,562	29,808	122,523	7181	5460	11,069
Cheung Sha Wan	51,656	25,069	106,248	7187	5007	10,308
Belvedere Garden	60,833	35,854	158,099	7800	5988	12,574
Luk Yeung Sun Tsuen	67,915	37,690	180,971	8241	6139	13,453
Tsuen Wan	60,893	29,323	149,037	7803	5415	12,208

Table 7  
Price variances of developed CDAs and their corresponding districts by period

Name of CDAs	Variance (thousand)			Standard deviation		
	Jan 88–Mar 89	Jan 92–Mar 93	Apr 89–Dec 91	Jan 88–Mar 89	Jan 92–Mar 93	Apr 89–Dec 91
Taikoo Shing	4482	9231	33,110	2117	3038	5754
Kornhill	2119	4168	33,044	1456	2042	5748
Shau Kei Wan	4560	10,456	28,470	2135	3234	5336
Heng Fa Chuen	2033	3949	44,889	1426	1987	6700
Chai Wan	2686	3278	38,000	1639	1810	6164
Whampoa Garden	251	4127	41,245	1533	2131	6422
Hung Hom	2161	5780	35,057	1470	2404	5921
Mei Foo Sun Chuen	1742	1353	11,605	1320	1163	3407
Cheung Sha Wan	2128	2742	10,583	1459	1656	3253
Belvedere Garden	1985	2560	12,947	1409	1600	3598
Luk Yeung Sun Chuen	2041	2794	12,988	1429	1672	3604
Tsuen Wan	1447	3979	9547	1203	1949	3090

In this study, Hypotheses 2 and 3 cannot be rejected, indicating that *prima facie* CDA zoning is beneficial in land value terms under condition of political stability. The results of this paper provide government and private planners with useful environmental and economic justifications for the imposition of CDA in land use.

## Conclusion

Estimating the impact of zoning on the economic value of environmental quality is useful to evaluate policies that affect the use of natural resources. In this study, we find that the areas with CDAs have higher economic values than the areas without CDAs. Thus, government zoning seems to be contributing to externality of property development. The zoning under CDA concept helps the development areas to have less environmental complaints and higher economic values.

This justifies the government planning policy in introducing appropriate regulations in land use.

While the zoning regulations in the CDA parts may create benefits, the regulations may not be adequate and may have more hazards than private planning. So the government zoning policies should be monitored regularly to reduce the risk of damaging the rights of leaseholders. The CDA zoning has proven to be an effective planning tool in urban restructuring. To keep track of the progress of implementation of CDA sites, the Planning Department would have to adopt a proactive approach to facilitate development by undertaking regular reviews with the applicants and developers concerned for resolving any technical problems.

Since Hong Kong adopts public leasehold systems, the government can recoup the future increased land value through four mechanisms: at the initial establishment of land leases; by the collection of land rent; during lease renewals; and through lease modifications.

Tse and Webb (1999) point out that land premium is an important tax resource of Hong Kong Government. Hong (1998) suggests that there are at least five factors that determine the changes in land value, namely: (1) rezoning; (2) changes in locational advantages as towns and cities expand; (3) improvements in public infrastructure and social services; (4) the growth of urban population through migration and urbanisation; and (5) increases in private investments in land. Thus increase in land values through careful planning will not only be a positive externality to landowners, the government can recoup this land value through establishing the initial land contracts, modifying the lease conditions and renewing leases.

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