GUIDELINES

FOR

BOT ROAD PROJECT DEVELOPMENT

UNDER

PUBLIC-PRIVATE PARTNERSHIP

MAY 2002

MINISTRY OF LAND, INFRASTRUCTURE,

AND TRANSPORTATION

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1. Background and Purpose

The BOT (build, operate, and transfer) method has been used worldwide to develop infrastructure. For private enterprises to develop and manage this method, governments must provide a certain environment. In some developing nations that lack such an environment, however, some BOT projects have been encouraged and even started, only to fail.

The goal of this guideline is to help ensure the success of future BOT projects.

1.1 BOT Problems with Transportation Infrastructure

Many nations rely on the private sector to build infrastructure.

Developing nations have strong demand for upgraded infrastructure but lack sufficient funding. These nations show keen interest in the BOT method (including BTO or BLT), which uses private funds. The BOT method is used to build power facilities and telecommunication systems, as well as transportation infrastructures.

Nonetheless, there is currently few active BOT investments in transportation infrastructures such as toll roads and LRT's in the developing nations. Some projects were suspended after losing money, while some BOT plans remain unimplemented due to a lack of private participation.

Transportation infrastructure is characterized by relatively high market risk. Demand for transportation fluctuates widely with socioeconomic changes in the country and the level of services provided by the transportation facility. This makes private companies extremely cautious toward participation in a BOT project.

Several projects have failed right after they were started, partly because real demand fell short of initial projections. This demand gap was caused not just by technical errors but also by the effects of lower fares for alternative, already available transportation and by developments in the neighborhood of the project site.

Because the types of transportation infrastructure that can be feasibly built using the BOT method are limited in number, it is important to select appropriate projects.

1.2 Success and Failure in BOT Projects

(1) Causes of Failure

An analysis of unprofitable BOT projects in developing nations suggests that these projects failed because of poor planning.

① Tolls set too high

To recover heavy investments, high tolls must be charged. On the other hand,

the toll level has a large influence on transportation demand, which substantially affects the profitability of BOT projects. For this reason, some projects have failed due to insufficient traffic resulting from high tolls.

② Demand projection too optimistic
Some projects were based on poorly compiled demand projections that differed greatly from actual traffic volumes. These projects were eventually halted.

③ Low profitability
BOT transportation projects generally are implemented in areas where alternate means of transportation already exist. This may result in large market risks. To ensure consistent profitability, transportation projects should be associated with other profit-earning activities, since the profits from a transportation project alone are limited.

④ Project too big
Some projects are too large in scale for a single private enterprise to undertake. In the past, these projects failed when fluctuations in business and exchange rates affected their management, forcing BOT enterprises to cease operation before the project could be completed.

These are some of the direct reasons why BOT projects have failed. The key factors behind these failures must be considered.

An analysis of BOT collapses implicates two factors:
① participation of private companies without careful consideration
② hasty government approval of projects without sufficient assessment

In other words, the roles of the public and private sectors were not clearly defined and fully discussed before the project was started.

(2) Reasons for Success

The following may be the reasons for the success of BOT projects in developed nations.

① Consistent demand
Ensuring stable profitability is the greatest factor in the success of transportation projects. BOT road projects are relatively profitable from the beginning when there is active transportation demand. In a number of cases, profitability improves when a project is implemented in the vicinity of a congested road.

② Limited project area
Many BOT projects are successful when they are limited to a certain part of a network, such as a bridge or a tunnel, and are implemented in an area lacking alternative routes. When a BOT project is initiated in an area with alternative

routes, the project may suffer from lower-than-projected traffic volume, depending on the convenience of such alternatives.

③ Positive public support

The BOT method is intended to be a means of procuring development resources, including construction funds, from the private sector. As such, the BOT method is absolutely a part of a country's transportation policy. In this respect, the public sector supports BOT projects, including the development of access roads leading to a planned toll bridge. Behind the BOT method is the recognition that roads are both infrastructures and public facilities.

1.3 The Need for Private-Sector Vitality

Not all BOT transportation projects are successful. For a project to be successful, better business conditions, including stable demand and public support, must be provided. Any project will fail without an adequate business environment.

Some BOT projects are unprofitable by nature, even when the government supports them. Private enterprises will not participate in a project if it is highly risky or fails to guarantee adequate revenues. Even if they declare their intention to undertake a highly risky project, private businesses may quit negotiations in the planning phase or suspend the project just after it is started.

In the past, transportation infrastructures were developed by the public sector because such projects involve high market risk and require a large sum of money. Private enterprises must accept substantial risk when they decide to take charge of a project. Currently, the public sector depends too much on the BOT method, generally leaving the business risk to private enterprises.

To make a BOT project successful, the government needs to not only improve the business environment but also formulate a new project scheme.

2. Introduction of Private Sector Vitality

The BOT method was developed as a means of improving public facilities through private funding and technology. Though they are carried out by private enterprises, BOT projects should be recognized not as private profit-earning projects but as projects promoted jointly by the public and private sectors.

2.1 Expectations of Participants in BOT Projects

The public sector that places orders for BOT projects, the citizens who use the roads, and the private sector that implements such projects, have the following expectations for BOT projects:

(1) Expectations of the Public Sector and Citizens

The public sector and citizens expect high-quality, consistent road services with minimal investment.

① Speedy, consistent improvement

Developing transportation networks is an important national policy with social and economic benefits. Expectations are high for BOT projects as a means of facilitating this policy. Therefore, projects of great urgency require prompt action to ensure an early start and consistent and continuous services.

② Adopt fair tolls to assure public acceptance

Tolls should be set at a level suited to the social and economic conditions of the project area. Full consideration must be given to the maintenance of an appropriate toll level so that the citizens extensively use the roads.

③ Benefit principle

Although toll roads are highly public in nature, access to them is controlled. This means that the costs of constructing and maintaining the toll roads can be collected from the users of the road. The concept of the user fee is widely acknowledged.

④ Financial self-sufficiency

Basically, the private sector plays a major part in the implementation of BOT projects. As a rule, therefore, private enterprises must manage a project using revenues from tolls and other project-related activities.

(2) Expectations of the Private Sector

Private enterprises expect consistent profits from BOT projects. To generate profits, the private sector expects the following of the public sector, which places the BOT order:

① Creation of sufficient demand

To succeed, a transportation BOT project must consistently achieve a certain level of toll revenue. For this purpose, the following matters must be taken into

account in order to generate the necessary traffic volume:

1) Right to operate in areas with steady demand
   The project area should include a location where there is consistent demand. The location should not have alternative means of transportation available. Desirable locations include bridges and tunnels, where demand is concentrated, and bypasses that are added to roads where there is sufficient demand.
2) Improvement of access roads
   To ensure demand in the BOT zone, access roads connecting to the zone should be fully developed or improved.
3) Control of competing routes
   Revenues from BOT projects should not be limited by the existence of competing roads or other means of transportation in the project area.
4) Toll compensation
   Toll levels that are appropriate for the social and economic conditions of the project area do not necessarily provide an adequate profit for the private business in charge of the project. To maintain a policy of low tolls, some type of compensation is required in order to guarantee that the project continues.

② Appropriate risk-taking by the public sector

To facilitate private implementation of a BOT project, the public sector needs to assume a certain level of risk in the project. For example, BOT enterprises may be compensated for losses resulting from a delay in land acquisition or access-road construction.

2.2 Infrastructure Improvement under PPP

To expedite BOT projects, the public sector, the citizens, and the private sector must develop a project scheme under which the three parties can share the benefits of the project. This project scheme should be designed so as to develop infrastructures that ensure the profitability of a private business. Establishing a successful project scheme depends largely on the public sector's understanding.

In 1999, Japan's Ministry of Construction (currently, the Ministry of Land, Infrastructure, and Transportation) released 'Guidelines for the Sharing of Responsibilities between the Public and Private Sectors for BOT projects.' Stressing the importance of both sectors sharing risk and concentrating on the duties allocated to each, these guidelines describe the role of each participant in the planning, ordering, and implementation phases. The guidelines aim to avoid the risk involved in a project by allowing the public and private sectors to take charge of those domains that allow each sector to utilize its expertise.

The above idea has been developed into the PPP (Public-Private-Partnership) concept. Under this concept, the public and private sectors are expected to closely cooperate to jointly plan a project and carry it out, instead of performing predetermined jobs independently of each other.

The PPP method differs from the conventional BOT method, which has been widely employed in developing nations but has often ended in failure. Conventional BOT projects are “consigned to private businesses by the government,” whereas BOT projects under the PPP system are “carried out through public cooperation with private companies.”

2.3 Positive Participation of the Public Sector in BOT Projects

Developing nations are characterized by the following factors:

- Steady growth in demand is expected with economic development, but the gestation period before profitability is relatively long.
- Economic instability makes these nations extremely susceptible to changes at home and abroad, creating large market risk.
- Economic instability also exposes foreign capital to the risk of fluctuating revenues due to exchange-rate fluctuations.
- The relatively short history of stable government in these countries generates substantial risk in connection with policy changes.

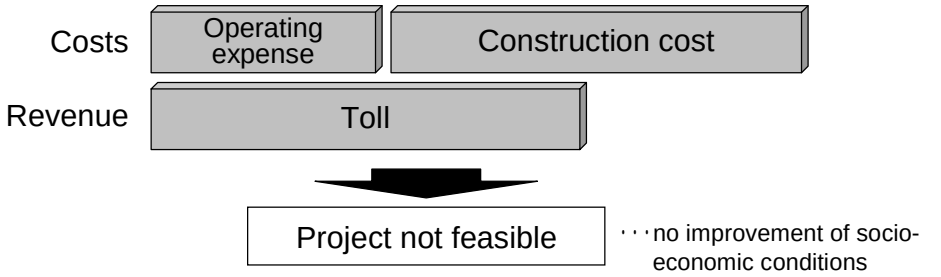
To ensure the success of BOT projects, the public sector should consider participating in BOT projects in a more positive manner. At the same time, the public sector should also improve the business environment.

1) Significance of public participation

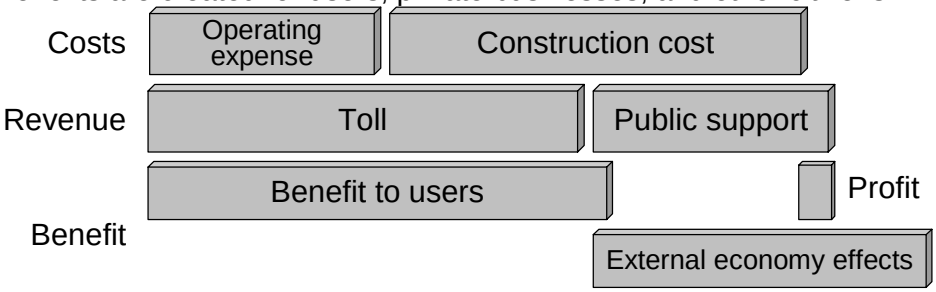
If the government shares the risks with a private company that joins a project considered unprofitable if undertaken by private enterprise alone, then the project will create socioeconomic benefits and fulfill the policy objective. In addition, such government participation permits the private business to set lower tolls, while maintaining profitability and creating more demand.

Figure 1. Public support and socioeconomic benefits

(1) When public support is not provided:
Costs and expenses exceed revenues, frustrating a project. No benefit is created.



(2) When public support is provided:
Revenues exceed costs and expenses through public financial support. Benefits are created for users, private businesses, and other citizens.



2) Effect of public funding

Public support alleviates the financial burden on the BOT enterprise, and improves its FIRR (Financial Internal Rate of Return, an indicator that shows the profitability of an investment in a project). On the other hand, the EIRR (Economic Internal Rate of Return, an indicator that shows the benefits of an investment of socioeconomic resources), remains unchanged irrespective of the public-private ratio of investment, because invested funds are a socioeconomic resource, whether they are provided by the government or by private enterprises.

Thus, once a project is successfully started with an improved FIRR as a result of public funding, a certain EIRR is guaranteed, placing both the citizens and the BOT enterprise in favorable positions.

3. BOT Projects under PPP

BOT projects that are implemented through cooperation between the public and private sectors projects are evaluated to determine their suitability as PPP (Public-Private-Partnership)-based BOT projects. Several risk hedges are examined. Risk hedges are used to develop a business plan that appeals to both the public and private sectors, which is necessary for the project to succeed.

3.1 Construction of PPP-based BOT Projects

(1) Expectations for the BOT method

A BOT project is defined as “the development of an infrastructure through direct private financing.” A conventional public project is implemented by the government either solely using public money, or with a partial consignment to the private sector. By contrast, a BOT project is implemented with private funds.

The public sector and users expect a BOT project to make an infrastructure more readily available because it is privately financed rather than part of a public works project. Moreover, they expect lower operating costs and better services based on the superior technology and management skills of private companies.

(2) Selection of a project

A BOT project is a “public project utilizing private-sector vitality.” Therefore, to become a BOT project, the project must, first of all, have value from a socioeconomic perspective. In addition, we must demonstrate that the project will be commercially profitable under the BOT method.

Figure 2 shows the process for selecting a PPP-based BOT project.

First, to qualify as a PPP-based BOT project, the project must have socioeconomic value.

Second, the BOT project must be self-sufficient in the absence of public assistance. At this stage, we verify that private enterprises exist with the competency to undertake the project, and consign the project to one of these enterprises.

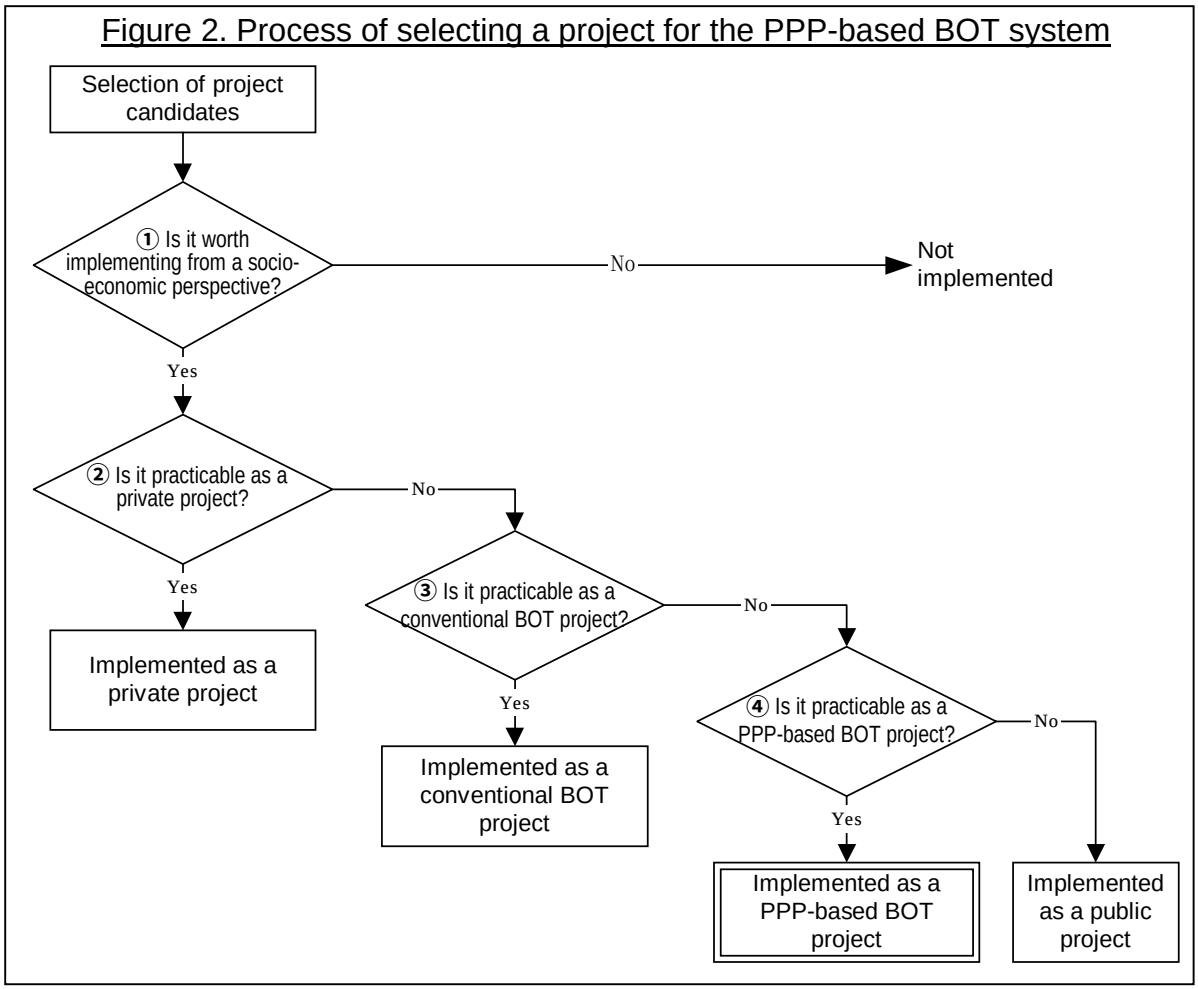
Third, if the project proves unable to sustain itself as a private project, it is reexamined to see if help from the public sector, in the form of land or other privileges associated with the project, will enable the project to succeed. If public support makes the project feasible, it will be put into operation. This conventional type of BOT project has been widely employed, with the public sector providing land or other measures of support and privileges while imposing certain constraints on the project.

Fourth, a project that does not qualify as a conventional BOT project may qualify as a PPP-based BOT project if the public sector accepts a greater role to make

it feasible.

Finally, if a project is expected to be unprofitable under the BOT method even with substantial public support, the project may be canceled. Or, if the project is considered indispensable, it will be implemented as a purely public project with special public financing.

Figure 2. Process of selecting a project for the PPP-based BOT system



3.2 Planning under PPP

Several transportation BOT projects have been abandoned in the planning phase, while others never got started. Behind these failures lies the fact that the public sector's expectations for these projects are incompatible with the way the private sector carries out its operations. It is essential to narrow the gap between them. For this purpose, the public sector needs to implement the following measures when carrying out a PPP-based BOT project.

(1) Clarification of the project

When clarifying the objectives of its transportation policy and the details of a project, the public sector should:

- Clarify the significance of developing transport networks to achieve economic targets.
- Define the objective of each project, and clarify the socioeconomic results expected of the project and any losses that may accrue if the project is not implemented.
- If these measures show, for example, that the lack of a structured road is creating traffic problems in the project area, resulting in socioeconomic losses, then the project should be conducted by the government. This makes it easier to gain national consensus regarding public participation in the project under the BOT method.

(2) Improvement in the PPP system

We need to recognize that BOT projects are “projects carried out jointly by the public and private sectors” and not “projects consigned by the public sector to the private sector.”

Under this consensus, the public sector should participate in BOT projects to make them successful, and the public sector and the private enterprise should share and allocate the profits and social benefits, as well as share the risk.

3.3 Risk Management

(1) Concept of risk hedges

Private enterprises participating in a highly risky road construction project must assume part of the risk. At the same time, the public sector must avoid the risks associated with private participation. Four vital risk hedges are discussed below.

① Market risk

In principle, market risk should be assumed by the private sector. Nonetheless, fluctuations in demand are partly caused by public policies toward regional development and road construction in the vicinity of a project site. Particularly in developing nations, where demand fluctuates widely, governments need to provide risk hedges, such as guaranteeing a minimum traffic volume.

② Credit risk

Credit risk is the risk that the private-sector partner will withdraw from the project. Some developed nations unfairly punish such withdrawals. A disproportionate burden on private enterprises discourages them from taking part in BOT projects. If the government provides appropriate risk hedges, however, private businesses will not make excessive demands to offset such burdens.

③ Financing risk

Financing risk is the risk that the private-sector participant will fail to acquire the necessary funds, forcing the enterprise to discontinue operations. This risk is generally assumed by the private enterprise and private investors.

In developing nations, however, where projects may lack operational stability,

financial support from the government can facilitate private participation.

④ Institutional change risk

Institutional change risk is the adverse effect of a change made in the economic policies or laws of the government. It is by nature entirely out of control of the private sector. To avoid this risk and encourage private participation, the public sector needs to clarify its own responsibilities.

In particular, changes in the transport policy, including setting tolls for transport facilities and introducing competing transportation systems, will significantly affect transportation demand around the project site. The government should clearly define the responsibilities to be assumed when policy changes result in a loss of revenue.

(2) Risk management through PPP

To ensure the smooth operation of a BOT project, the public and private sectors should cooperate to introduce risk hedges so that each assumes an appropriate share of the risk. To carry out PPP-based risk management, the public sector should develop a project in accordance with the following steps:

① Recognition of private role and competence

Before determining the roles of the government and the private sector in a BOT road project, the government should understand the role and competence of each participant.

② Project analysis

In planning a project on behalf of the government, the public sector should review the opinions and proposals provided by the private sector and reexamine its plan from the perspective of the private sector.

Similarly, a plan compiled by a private participant must be reviewed from the public's point of view.

③ Review of necessary measures

The project should be reviewed to determine whether or not it is workable under appropriate risk management. When necessary, alterations should be made to the project scheme, including alterations of the project itself and to the public support policy.

These steps must be implemented by the public sector, which should take into account not only its own reviews but also the opinions and proposals from the private sector.

(3) Appropriate toll setting

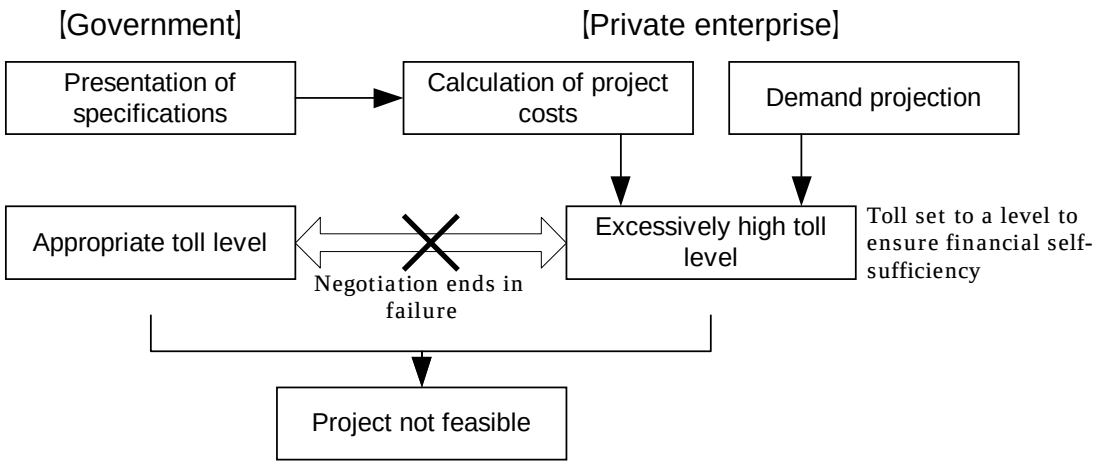
Setting an appropriate toll is critical for road construction projects. Even in a BOT project, using government policy to set the toll level is fully justified, since the transport infrastructure is constructed in the public interest under an exclusive contract. At the same time, however, the private participant desires a

higher toll to ensure profitability. These conflicting interests tend to interfere with the progress of projects.

Figure 3 shows the current toll-setting process and the problems involved.

A project needs to establish an appropriate toll level to cover the expenses of a high-quality infrastructure. A higher toll will reduce traffic volume, thus frustrating the project. To avoid this, it is necessary to conduct demand projections before a project is started. In practice, however, there have been a number of cases in which a BOT project has gone into operation without prior demand projections or financial considerations.

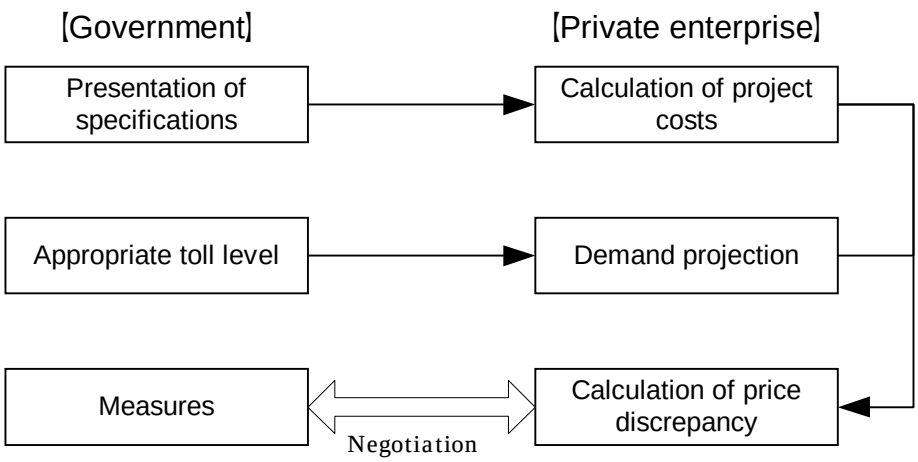
Figure 3. Disagreement between the public and private sectors over setting tolls



Since a BOT project is a financially independent project in which the private enterprise assumes the demand risk, the toll must be set to a level that ensures profitability. In developing nations in particular, the tolls set by a private enterprise frequently exceeds the level calculated from a socioeconomic perspective, leading to the failure of the project.

To avoid this problem, tolls should be set to the level calculated from the socioeconomic conditions. If there is a discrepancy between this level and the level needed by the private-sector participant, some form of compensation should be formulated and implemented under public-private partnership. A toll level is appropriate if it is acceptable to the citizens from a socioeconomic viewpoint.

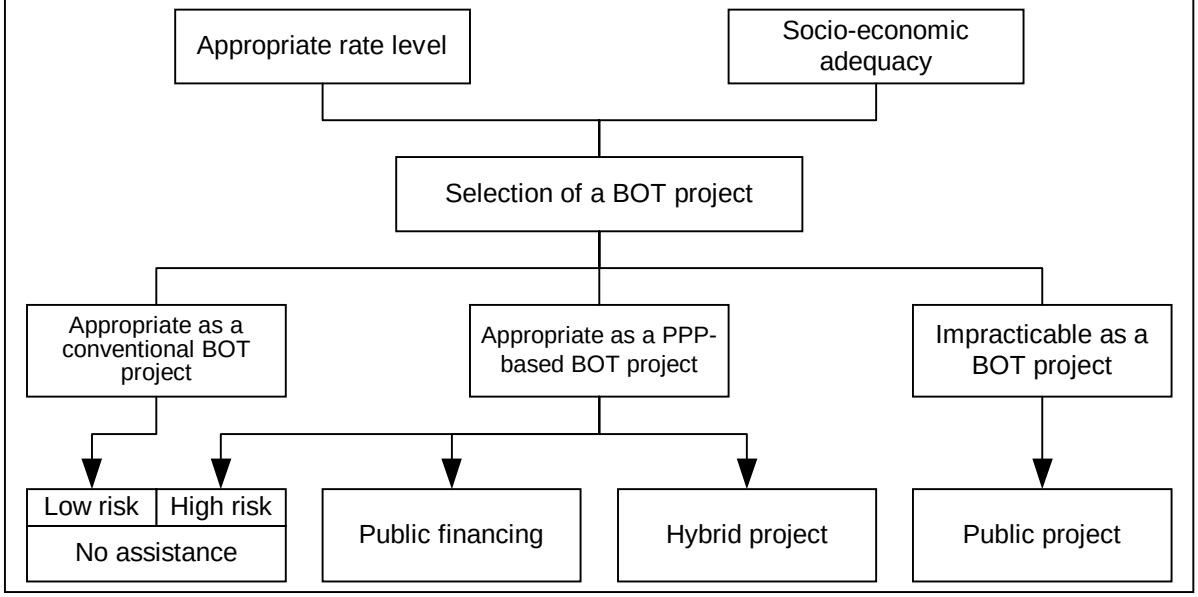
Figure 4. Negotiations to maintain a certain toll level



To calculate the appropriate rate level that will make a project feasible, we must determine the degree of public participation. Then, the project can be classified as a conventional BOT project, PPP-based BOT project, or public project.

There is a hybrid version of the PPP method that will be described later. If a project is expected to face a shortfall in public funding under the PPP system, it may be implemented as a conventional BOT project despite the higher risks.

Figure 5. Selection of a BOT project and the appropriate rate level



4. Proposal for a PPP-based Project Scheme

A PPP-based BOT project requires an appropriate project scheme. For this purpose, these guidelines propose a hybrid project scheme.

4.1 PPP-based scheme

In a project based on a public-private partnership, a key issue concerns the degree of public cooperation with the private partner. Fundamentally, a PPP-based BOT project is carried out by the public sector using private money and other private capabilities. Therefore, the public sector should develop a project scheme that facilitates private participation. Under such a scheme, the public and private sectors, although independent of each other, cooperate with each other and, when necessary, work interdependently, instead of performing tasks separately.

In implementing a PPP-based BOT road project, the public sector may either invest in the project and set up a joint project company with a private enterprise, or provide a subsidy to the project company in order to share costs and expenses with the private enterprise. The two alternatives involve public money, which makes them more attractive to private enterprises than conventional BOT projects. At the same time, however, these alternatives make it more difficult to clarify where responsibility lies in a project.

Financial aid provided by the government to private enterprises may be useful for projects intended to improve the minimum living standard of a community, such as the development of a remote rural area. However, public support requires national consensus when it comes to projects that add a toll road to existing open roads. We must discuss the appropriateness of using public money to finance a private profit-making project.

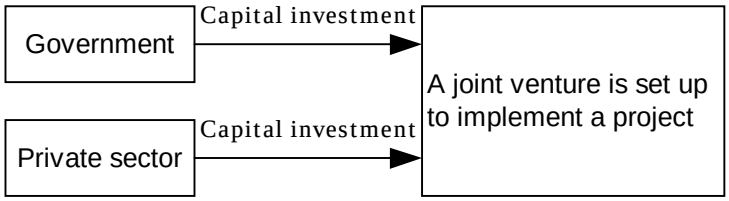
As mentioned previously in these guidelines, we endorse public assistance in the construction of toll roads in developing nations, because these roads are basic infrastructures that help improve the lives of the people. National consensus has yet to be formed on such public assistance.

The proposed hybrid-type PPP scheme encourages the public and private sectors to cooperate as they carry out their responsibilities. (Figure 6)

Figure 6. JV-type and hybrid-type schemes

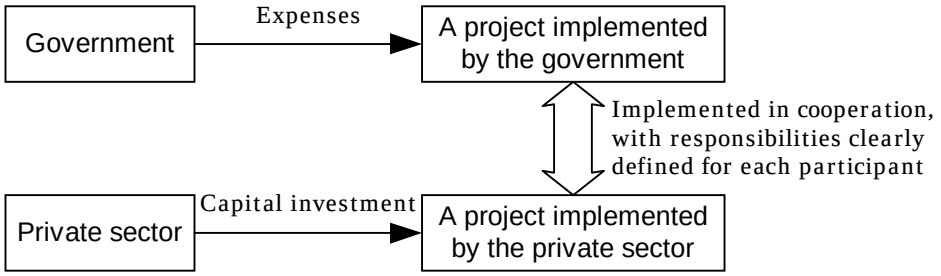
(1) JV-type PPP-based scheme

The public and private sectors jointly establish a special purpose company that will construct, operate, and maintain the BOT project.



(2) Hybrid-type PPP-based scheme

A project shall be divided into two parts for greater financial viability on the part of the BOT company, as well as greater structural function and/or integrity of the project. The project shall be set up using public funds for one part and private funds for the other. Afterwards the whole project shall be operated and maintained with private funds only.



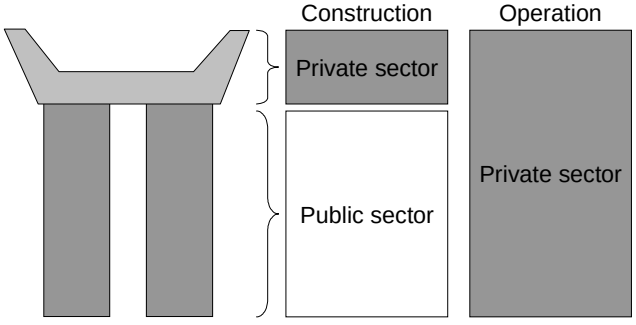
4.2 Hybrid-type Road Implementation

(1) Vertical separation

In hybrid road construction, construction, even of the same section, is shared between the public and private sectors. For example, the roadbed is built by the public sector, while the private partner paves the road. The section is then maintained and operated by the private partner. In the construction of an elevated road, the public sector may build the piers while the private partner builds the road section.

Under the hybrid system, each responsibility is made clear as each job is defined and allocated among the participants. On the other hand, a delay on the part of either partner may delay the start of service. Therefore, it is essential for both sides to maintain full coordination.

Figure 7. Hybrid project (Type 1)(Vertical separation)

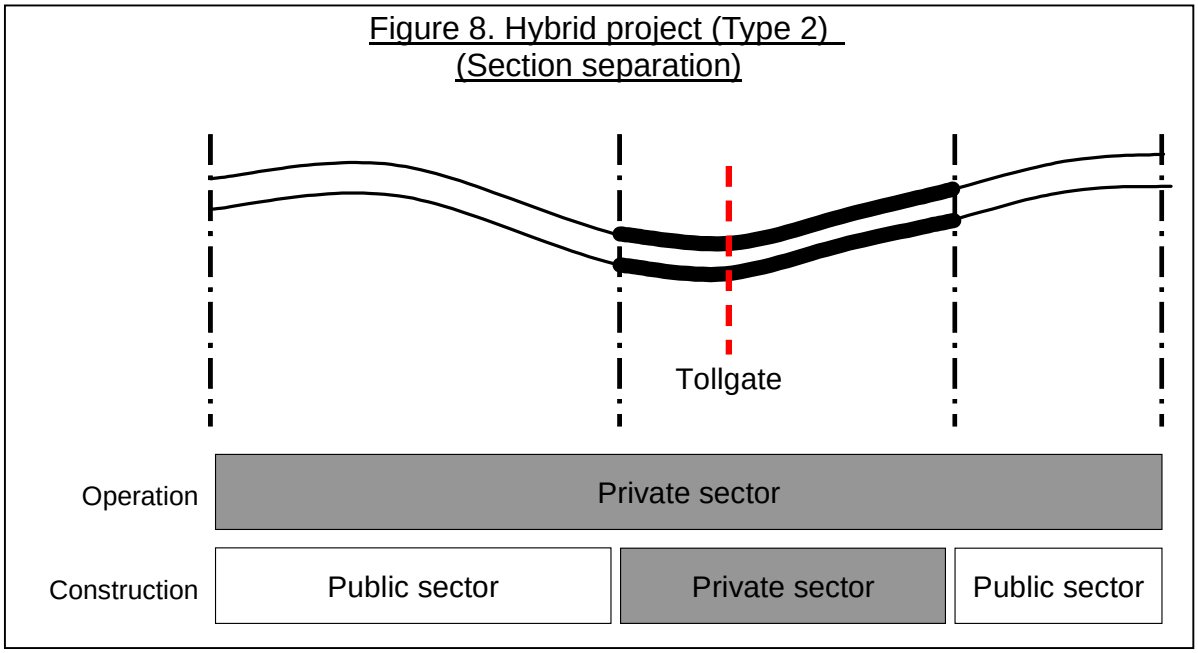


(2) Sectional separation

Under the sectional separation method, a road is segmented into a number of sections, which then are allocated between the public and private sectors. For example, a bridge and an access road are built by the private business and the public sector, respectively. The maintenance and operation of the completed road are placed in the hands of the private business. In another example, the public sector may take charge of the main road, while the private partner is responsible for the interchanges.

Under the sectional separation system, each responsibility is made clear, with distinct sections allocated between the participants. If one section becomes operable in its own right earlier than the other, then at least part of the service planned for the whole project can begin.

Figure 8. Hybrid project (Type 2)
(Section separation)



5. Public Role in the Promotion of BOT Projects

To promote PPP-based BOT projects, the government must not only review existing BOT project schemes and procedures, but also make the PPP system well known to the public.
In addition, when a BOT project fails to cover its costs with public funding, coordination with an ODA project should be considered.

5.1 Public Role

To smoothly promote BOT projects, the public sector must participate in them in a more active manner. The following activities should be considered:

① Develop a system for participating in BOT projects
National consensus should be formed on public participation in BOT projects. It is essential to institutionalize a concrete framework for such activities. The public sector should also establish rules to limit public investment. These rules should consider the relationships between construction costs, M&O costs, public payments, and socioeconomic benefits.

② Establish appropriate project plans
BOT project plans must be designed so that the construction of transportation infrastructures not only conforms to the nation's development programs, including economic development plans, but also guarantees the profitability of the projects. To encourage private participation, demand projections should be based on the results of market surveys and not mere expectations.

③ Incorporate private-sector creativity into specifications
Order specifications should incorporate original ideas from the private sector. These ideas can pertain to the use of vertical spaces, the integrated development of roadside areas, and the construction of road sections.

④ Reinforce financial resources for road construction
Reinforcing financial resources is critical if the government is to support BOT projects or implement road construction on its own. Financial resources can be expanded when the financial burden is shared widely by a large number of individuals who can afford it, even if they each invest just a small amount of money. Particularly since transportation demand is expected to increase in the future, financial resources can be effectively built up when beneficiaries bear the financial burden, as is the case with Japan's management system.

⑤ Guarantee transparency and fairness in the selection of private BOT participants
To promote private participation and public confidence in BOT projects, the government should guarantee transparency and fairness when selecting BOT participants. Measures should include open competitive bidding and proposal competition.

5.2 Utilization of Various Financial Resources

PPP-based projects are carried out by private enterprises and the public sector using private and public money. The public sector opts for BOT projects, which are partially funded by the private sector, because the government often lacks sufficient funds. To implement a PPP-based project, the public sector raises funds from various sources, including ODA funds.

(1) The relation between ODA and BOT projects

ODA activities are not intended to support private enterprises. In road construction, the objective of ODA activity is to stabilize or improve the society, economy and environments of developing nations. The construction of transportation networks is part of such ODA activities. BOT projects may be carried out using ODA funds. Thus, ODA programs can play a vital, although supplementary, role in the promotion of BOT projects.

① Expectations of ODA for BOT projects

When a transportation network is constructed with ODA support, the ODA side can save at least part of its investment if even a single section of the network can be feasibly implemented as a BOT project. Besides, through BOT participation, ODA programs can attain their objective of socioeconomic development at an earlier stage. For these reasons, BOT project application is recommended for at least a part of every ODA transportation network.

② Expectations of BOT projects for ODA

If a transportation network developed with ODA funds connects to a planned BOT area, the prospective BOT participants will be more willing to take part in the project because of the potentially greater revenue. In addition, the BOT project can expect to enhance its international credibility because of the ODA connection.

(2) ODA's support to PPP-based BOT projects

To promote PPP-based BOT projects in developing nations, the following forms of assistance should be considered.

① Technical Assistance such as M/P and FS

Technical assistance includes the institutionalization of BOT projects, the compilation of specifications for individual BOT projects, and the evaluation of BOT applicants.

② Provision of funds and loans to governments to build an infrastructure under a joint ODA program and BOT project

If necessary, ODA programs can include the construction of open roads connecting to a BOT toll road, the development of areas surrounding a BOT site, and the construction of road infrastructures related to a planned BOT project. These supportive activities will stabilize the profitability of the BOT project and help gain international trust in the project, which in turn will

expedite public financing by international banking institutions.

③ Assistance in the introduction of new technologies

BOT projects have the goals of introducing advanced technologies owned by private businesses, as well as cutting public expenditures. The ODA program should help developing nations build infrastructures that introduce such technologies as ITS (Intelligent Transport System)

Special thanks

We would like to offer a special thank-you to the Government of the Philippines, which provided valuable comments about this guideline.

Appendix Case Study for PPP-based BOT Project

This is a case study for checking the feasibility of a PPP-based BOT Project.

1. Project

This toll road is a 4-lane radial road in a metropolitan area of a country.

The toll road network that includes this road was studied for an ODA program. Two ring roads (11km) and 11 radial roads (87km) will have been developed by 2010.

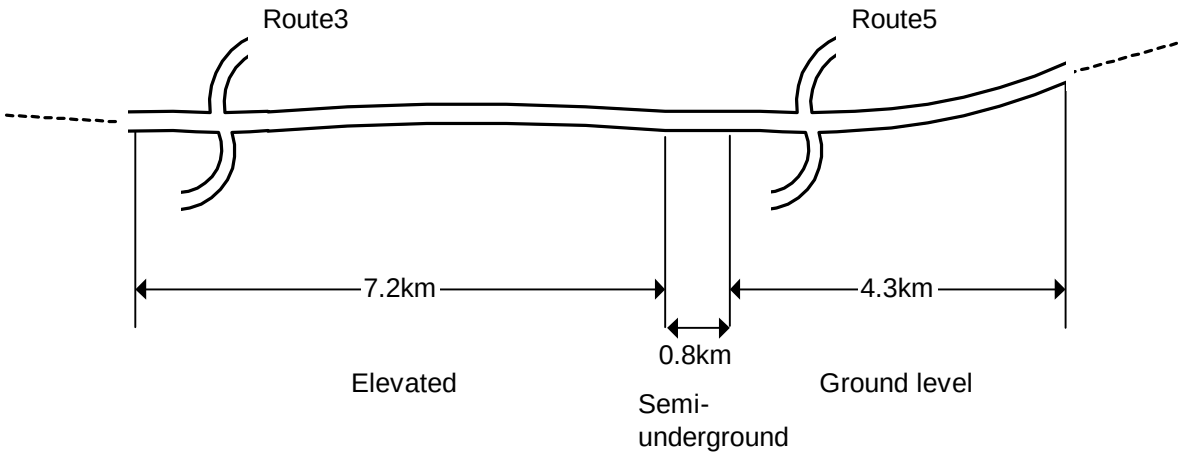
This road passes through a highly congested area and will be the major road from a neighboring city to the center of the metropolitan area. The area along the road has been developed as a high- and middle-class residential area. Private traffic volume in this area is expected to increase rapidly.

At present, there is no toll road in this area. This road will be a vital alternative to the present open roads.

The target road consists of an elevated section (7.2km), a semi-underground section (0.8km), and a ground-level section (4.3km). All intersections will be grade separations.

Some residents illegally occupy a part of the land, but it is assumed that they will move out before construction begins.

Fig. Map of the proposed road



2. BOT Plan

(1) Traffic volume

The volume will increase because the road passes through an active area and the connecting roads and roadside areas are still being developed.

Year 2001	16,000 ADT
Year2015	60,000ADT
Later	increasing 10% per year, to a maximum of 100,000ADT

(2) Project Costs

Construction Costs:	143Mil. USD
Maintenance Costs:	0.4Mil. USD / year
Operating Costs:	0.6Mil. USD / year

(3) BOT Condition

Project Type:	BTO
BOT terms:	30 years (construction: 3 years, operation 27 years)
Land :	Provided by the government
Financial Guarantee :	No

(4) Toll

0.9 USD/vehicle

(5) Financial Plan

Equity : Dept = 30% : 70%
(Equity should be more than 20%, the BOT rule for this country)

(6) Feasibility Test

After inspecting the financial analysis of this project, it was found that the construction costs would decrease the expected profit from the project. The rate of return on equity (ROE) would be only 5%. That means this project is not feasible as a BOT project.

3. Restructuring the BOT Plan

The original BOT plan was restructured to make it feasible.

(1) Toll Level

Tolls are often raised to improve profitability. But an increase will reduce the number of users of a road. It is necessary to determine the appropriate toll level based on the economic conditions surrounding the road and the relation between toll levels and traffic volumes. In this study, the appropriate toll was determined to be 1.4 USD/vehicle after a study of tolls for nearby roads and the relationship between toll levels and traffic volumes.

Future traffic volumes under the new toll level (1.4 USD/vehicle) were projected, and it was concluded that the new toll would have little influence on traffic volume.

(2) PPP

Two types of PPP were considered.

a) Sharing market risk

If the annual traffic volume after 15 years becomes less than 80% of the forecast volume, the public sector will compensate the private enterprise for the loss of the revenue.

If the annual traffic volume exceeds 120% of the forecast, the private enterprise will give the excess revenue (that which exceeds 120%) to the public sector.

b) Hybrid Project

The public sector constructs some portions of toll roads, which lightens the burden on the private enterprise.

(3) Others

Some other conditions were modified. The ratio of the return on equity was reduced from 30% to 20%.

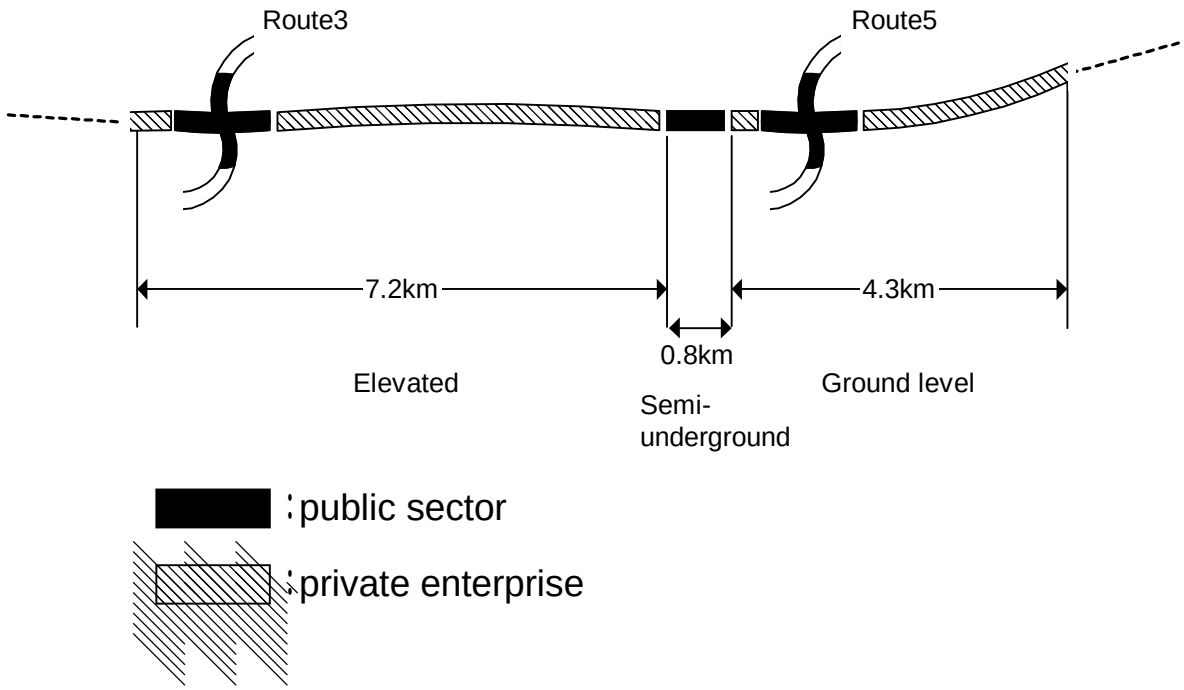
(4) Feasibility Test

After restructuring the project scheme, it was found that this project would be feasible, with an ROE of 15%, if 30% of the construction cost could be saved. Furthermore, the risk sharing by the public sector would make participation by private enterprises highly likely.

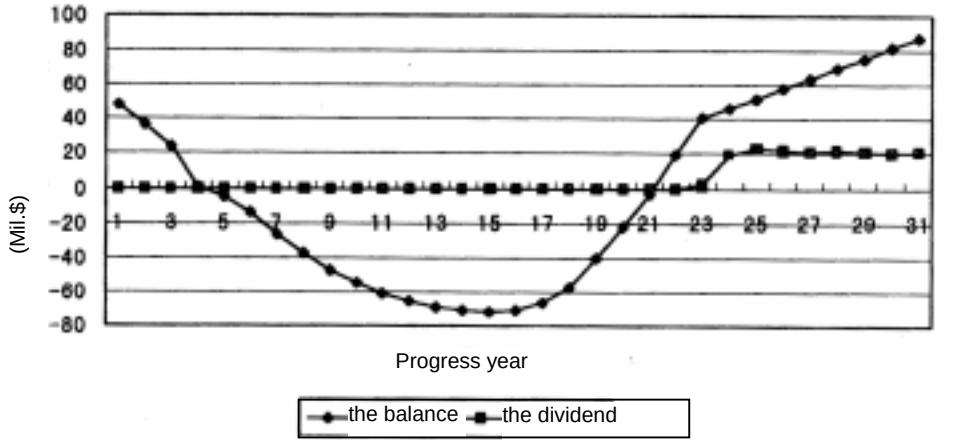
4. BOT Plan under PPP

This project is feasible once it is adapted as a PPP-based BOT Project. Sectional separation will be the most suitable method of construction for this project.

		Public	Private
Construction		Interchange with Route 3 Interchange with Route 5 Semi-underground section (0.8 km)	Elevated section (7.2 km) Level section (4.3 km)
	Cost	43 Mil. USD	100 Mil. USD
M&O			All Sections
	Cost		1.0 Mil. USD /year

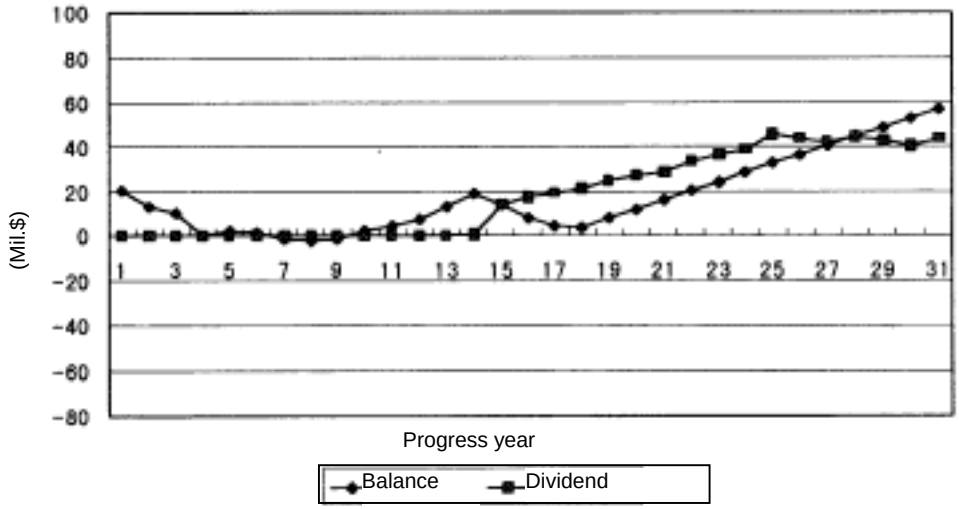


Transition of the balance and dividend



ROE in the Original BOT Project : 4.8%

Transition of the balance and dividend



ROE in the PPP-based BOT Project : 15%